

# For Reference

NOT TO BE TAKEN FROM THIS ROOM

# For Reference

---

NOT TO BE TAKEN FROM THIS ROOM

Ex LIBRIS  
UNIVERSITATIS  
ALBERTAENSIS











THE UNIVERSITY OF ALBERTA

A QUALITATIVE ANALYSIS OF THE VOCABULARY RESPONSES  
OF GOOD READERS AND POOR READERS

by

MARY ANASTASIA GRANT

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES  
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF EDUCATION

DEPARTMENT OF ELEMENTARY EDUCATION

EDMONTON, ALBERTA

SEPTEMBER 1965



UNIVERSITY OF ALBERTA  
FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "A Qualitative Analysis of the Vocabulary Responses of Good Readers and Poor Readers," submitted by Mary Anastasia Grant in partial fulfillment of the requirements for the Degree of Master of Education.





Digitized by the Internet Archive  
in 2019 with funding from  
University of Alberta Libraries

<https://archive.org/details/Grant1965>

## ABSTRACT

The pupil's ability to think of the word in an abstract way may be an essential condition for success in reading. Since the poor reader may well be differentiated from the good reader by his inability to take appropriate meaning to the printed page a study of the development of meanings and concepts is important.

The purpose of this study was to make a qualitative analysis of the oral responses of good and poor readers to the vocabulary subtest of the Stanford-Binet Intelligence Scale, Form L-M. It sought to determine whether the poor reader was less abstract in defining words than the good reader of the same sex, I.Q., and chronological age. The basic assumption underlying the study was that an analysis of vocabulary would yield useful data concerning the child's concept development.

The sample for the study consisted of thirty matched pairs of students selected from the population of grade six students in the Edmonton Separate Schools. Pairs were matched on the basis of intelligence, chronological age and sex. The total sample consisted of 16 female matched pairs and 14 male pairs.

Pupils responded orally to the vocabulary subtest of the Stanford-Binet Intelligence Scale, Form L-M. Responses were taped and later transcribed. Quantitative scoring was first completed. Responses were then analyzed qualitatively according to a fivefold classification





system composed of the following major categories: Synonym; Use, Description, and Use and Description; Explanation; Demonstration, Repetition, Illustration and Inferior Explanation; and Error. The qualitative categories Synonym; Explanation; Use, Description, and Use and Description; Demonstration, Repetition, Illustration and Inferior Explanation were held to represent a hierarchy of conceptual levels according to which responses could be graded on a continuum from the most concrete to the most abstract type of response. Statistical analysis utilizing the "t" test was made of the differences in response between good and poor readers.

The results of this study seem to indicate a significant difference in abstract verbal behaviour between matched pairs of good readers and poor readers. No particular type of definition was made exclusively by either group. However the good readers gave a significantly greater number of abstract responses. The results suggest that these children tend to conceptualize on more complex levels than do a matched group of poor readers. The poor readers tend to observe more words as concrete ideas and generalize less from the particular. They tend to respond to the verbal stimulus in terms of immediate and concrete criterial attributes more frequently than do the good readers.

The results of the study must be viewed in the light of certain limitations. A degree of subjectivity was unavoidable in the scoring. It was found that children's definitions take a variety of



forms at this age and there is difficulty in distinguishing between them except in the most empirical way. The type of verbal response achieved in a recall test may be in part a function of the characteristics of the stimulus word. Moreover, a range of qualitative levels may be observed in the vocabulary responses of any individual.

However, it is indicated that an assessment of vocabulary responses in terms of qualitative levels may supplement other diagnostic techniques used in the classroom and serve to throw further light on the differences which may exist in the thinking of good and poor readers.

The findings of this study suggest the need for further emphasis on concept development in regard to poor readers, and more specifically, the need for emphasis on definition and analysis is indicated.





## ACKNOWLEDGMENTS

The writer wishes to acknowledge her indebtedness to Dr. M. D. Jenkinson, Supervisor, for the guidance and assistance which she gave so generously during the planning and preparation of this thesis. Appreciation is also expressed to Miss D. L. Lampard and Dr. E. W. Buxton, members of the advisory committee, for their interest and counsel. The cooperation of the Edmonton Separate School Board, in whose schools this project was carried out, is gratefully acknowledged.





## TABLE OF CONTENTS

CHAPTER	PAGE
I. THE PROBLEM . . . . .	1
Introduction . . . . .	1
Maturational levels in concept formation . . . . .	3
Assumptions . . . . .	3
Purpose of the Study . . . . .	4
Hypotheses . . . . .	4
Definition of Terms . . . . .	5
Design of the Study . . . . .	7
Significance of the Study . . . . .	8
II. A REVIEW OF THE RESEARCH . . . . .	10
Concept Formation . . . . .	10
Characteristics of a concept . . . . .	11
Concepts of children . . . . .	13
Types of concepts . . . . .	13
The development of concepts . . . . .	13
Factors affecting concept formation . . . . .	20
Qualitative Development in Vocabulary	
Responses . . . . .	21
Reading and Concept Formation . . . . .	34
First-hand experience . . . . .	38
Summary . . . . .	39



CHAPTER	PAGE
III. THE DESIGN OF THE STUDY . . . . .	41
The Sample . . . . .	41
Otis Self-Administering Test of Mental Ability . . . .	43
Gates Reading Survey . . . . .	44
The Test . . . . .	46
Quantitative score . . . . .	48
Qualitative score . . . . .	48
Fivefold classification system . . . . .	50
Hierarchy of conceptual levels . . . . .	51
Reliability of scoring . . . . .	54
Description of the Qualitative Categories . . . . .	55
Analysis of the Data . . . . .	59
Summary . . . . .	61
IV. ANALYSIS OF THE DATA . . . . .	62
Characteristics of Pupil Responses . . . . .	63
Quantitative Analysis . . . . .	65
Differences in Qualitative Responses Between	
Good Readers and Poor Readers . . . . .	68
Total performance . . . . .	68
Selected responses . . . . .	70
Weighted scores . . . . .	72
Differences in Performance of Boys and Girls . . . . .	76
Error Category . . . . .	81
Summary . . . . .	88





CHAPTER	PAGE
V. CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS . . . . .	89
Conclusions , . . . .	90
Hypothesis 1 . . . . .	90
Hypothesis 2 . . . . .	91
Hypothesis 3 . . . . .	91
Hypothesis 4 . . . . .	92
Summary of conclusions from hypotheses . . . . .	92
General conclusions . . . . .	93
Limitations . . . . .	94
Implications . . . . .	96
Suggestions for Further Research . . . . .	99
Summary . . . . .	100
BIBLIOGRAPHY . . . . .	101
APPENDICES . . . . .	111
Appendix A. Example of Responses . . . . .	112
Appendix B. Vocabulary Subtest . . . . .	126
Appendix C. Mental Ability Test . . . . .	128
Appendix D. Reading Test . . . . .	129



# LIST OF TABLES

TABLE	PAGE
I. Chronological Age, Reading Test Scores and Intelligence Test Scores of Good Readers and Poor Readers . . . . .	45
II. Differences Between Quantitative Vocabulary Scores of Matched Pairs of Good Readers and Poor Readers . . . . .	66
III. Differences Between Qualitative Vocabulary Scores of Matched Pairs of Good Readers and Poor Readers Based on Total Performance . . . . .	67
IV. Differences Between Qualitative Vocabulary Scores of Matched Pairs of Good Readers and Poor Readers Based on Correct Response to Identical Items . . . . .	71
V. Differences Between Weighted Scores of Matched Pairs of Good Readers and Poor Readers Based On Total Performance . . . . .	74
VI. Differences Between Weighted Scores of Matched Pairs of Good Readers and Poor Readers Based on Correct Response to Identical Items . . . . .	75
VII. Difference Between Quantitative Vocabulary Scores of Boys and Girls . . . . .	77



TABLE	PAGE
VIII. Difference Between Quantitative Vocabulary	
Scores of Boys and Girls, Good Readers . . . . .	78
IX. Difference Between Quantitative Vocabulary	
Scores of Boys and Girls, Poor Readers . . . . .	79
X. Differences Between Qualitative Vocabulary	
Scores of Boys and Girls Total Group . . . . .	80
XI. Differences Between Qualitative Vocabulary	
Scores of Boys and Girls, Good Readers . . . . .	82
XII. Differences Between Qualitative Vocabulary	
Scores of Boys and Girls, Poor Readers . . . . .	83
XIII. Error Categories of Good Readers and Poor	
Readers . . . . .	84
XIV. Error Categories of Good Readers and Poor	
Readers, Boys . . . . .	86
XV. Error Categories of Good Readers and Poor	
Readers, Girls . . . . .	87





## LIST OF FIGURES

FIGURE	PAGE
I. Mean Frequency of Use of Five Qualitative Categories by Age . . . . .	52



## CHAPTER I

### THE PROBLEM

#### I. INTRODUCTION

The individual's meaningful response to the graphic symbol is a critical element in the reading act (86). An important determinant of this response is the depth and variety of the individual's concepts. Newell (63) defines reading as "the association of a perceived symbol with a concept already existing in the mind" (p. 183). McKee (61), in discussing the role of printed symbols, says:

...they act merely as fuses to stimulate him (the reader) to make meaning in his mind. This he does by recalling, manipulating, and combining concepts that the printed symbols stand for. If the reader does not possess the concept of meaning that the printed symbol represents, it is utterly impossible for him to read the symbol and achieve meaning even though he may learn to recognize the symbol mechanically in either visual or auditory form. Thus it is clear that the real and fundamental source of meaning in reading lies in the concepts that the reader takes with him to the printed page (p. 115).

A significant aspect of the child's concepts in relation to reading may be their qualitative level in terms of a continuum from concrete to abstract. Dawson (21) has pointed out that individuals differ in their ability to react to symbols and their interpretations have varying degrees of accuracy. They think of words in their general or specific sense. Dechant (22) has indicated that success in reading frequently depends on the pupil's ability to think of the





word in an abstract way and that generally the more generic the reaction to the printed words the more effective is the communication between reader and writer. He has written:

With experience the person makes the word generic in meaning. He abstracts, forms concepts, learns to associate these concepts with printed symbols, and identifies the word with a category or a class of objects. When perception is on an abstract level, when the reader associates a concept with a word, then, indeed, perception is a kind of summing up of the meanings of numerous sensory impingements. The reader then is capable of bringing sufficient meaning to the printed page to permit him to obtain from the page an approximation of the experience that the writer is trying to convey. The reader attains an understanding of the writer's experience and hence his perceptions. Only then is communication via reading taking place (p. 21).

Although experimental evidence concerning the relationship of concept development to reading is still meagre the trends are significant. In 1917 Thorndike (95) investigated errors in paragraph comprehension in which he showed the difference between simply saying the words to oneself as one read and understanding what was being read. More recently studies by Jay (46), Burks and Bruce (12), Kress (51), Jan-Tausch (45), Braun (8), and Wickens (109) have contributed to knowledge in this area. A more detailed review of these studies is given in the review of the literature. The evidence to date has led Smith and Dechant (86) to suggest certain general conclusions:

1. The greater the number of concepts that the reader has fixed through words, the better tends to be his understanding of what he reads.
2. The more specific the reader's reaction to printed words, the less effective tends to be the communication between writer and reader; and the more generic the reaction, the more effective tends to be the communication.



3. Differences in abstracting ability or in ability to think in categories generally differentiate the superior reader from the poor reader (p. 38).

### Maturational Levels in Concept Formation

Research indicates that there are maturational levels that may be expected of children. Russell (80) has stated that concepts change from immediate to remote, concrete to abstract, simple to complex, egocentric to social, diffuse to focused, vague to specific, and contradictory to consistent.

Developmental theories bearing on the problems of concept formation have been constructed by a number of psychologists such as Piaget (67), Goldstein and Scheerer (32), and Werner (106). These theories differ in various ways, but have a number of points in common. The child is said to develop (once past a strictly sensory-motor stage) from a concrete-perceptual to an abstract-conceptual level of thought (49). Mature abstractness of thought is generally believed to occur at about age eleven or twelve.

## II. ASSUMPTIONS

The basic assumption underlying this study is that an analysis of vocabulary will yield useful data concerning the child's concept development. Russell (79) has pointed out that a concept is not a word. "However, a concept involves a word or phrase, or some other sign or symbol . . ." (p. 118). Moreover, despite exceptions, it seems true that the child's store of concepts and his functioning vocabulary





are usually composed of many of the same items. The relation of language with the thought processes of the individual has long been recognized although as Balkan (3) has pointed out the assumptions regarding thought and language and commensurability of the two have never been explicitly articulated in psychological investigation. Concerning the language of children, Terman (89) has stated that the type of definition used by the child throws interesting light on the maturity of his apperceptive processes. Piaget (66), in his studies of children's language showed that words are bound up with the thought of the child. Vygotsky (98) has stated that word meanings are dynamic rather than static formations. They change as the child develops.

### III. PURPOSE OF THE STUDY

The purpose of this study is to make a qualitative analysis of the oral responses of good and poor readers to the vocabulary subtest of the Stanford-Binet Intelligence Scale, Form L-M. It seeks to determine whether the poor reader is less abstract in defining words than the good reader of the same sex, intelligence, and chronological age.

### IV. HYPOTHESES

The study is designed to investigate the general hypothesis that the ability to define words abstractly has developed more slowly





in a group of poor readers than in a group of good readers.

For the purposes of the experiment the following specific null hypotheses were assumed:

1. That the good reader does not produce significantly more synonym or class type responses than the poor reader.
2. That the poor reader does not produce significantly more use and description type responses than the good reader.
3. That the good reader does not produce significantly more explanation type responses than the poor reader.
4. That the poor reader does not produce significantly more inferior type responses than the good reader.

#### V. DEFINITION OF TERMS

For the purpose of this study the meaning to be attached to certain terms is as follows:

Qualitative analysis. Qualitative analysis refers to an analysis of vocabulary responses based on a five-fold classification system established by Feifel (25). This system includes the following five categories: (1) Synonym, (2) Use, Description, and Use and Description, (3) Explanation, (4) Demonstration, Repetition, Illustration and Inferior Explanation, (5) Error.

Vocabulary responses. By vocabulary responses is meant the oral responses of good and poor readers to the vocabulary subtest of the Stanford-Binet Intelligence Scale, Form L-M.



Good reader. A good reader is a student in grade six whose average reading grade score on the Gates Reading Survey, Form 2, had a percentile rank greater than seventy-five in terms of local norms for grade six.

Poor reader. A poor reader is a student in grade six whose average reading grade score on the Gates Reading Survey, Form 2, had a percentile rank below twenty-five in terms of local norms for grade six.

Intelligence quotient. In this study the intelligence quotient is derived from the score obtained on the Otis Self-Administering Tests of Mental Ability, Intermediate Form.

Conceptual level. By conceptual level is meant the degree of mental maturity reflected in the oral responses to the vocabulary subtest, Stanford-Binet Intelligence Scale, on a continuum from the most concrete to the most abstract type of response.

Concrete concepts. The definition is based on that of Johnson (47). The formation of concrete concepts involves an organization of experience in which the grouping of perceptual elements of the stimulus situation is sufficient for adequate categorization.

Abstract concepts. The definition is based on that of Johnson (48). The formation of abstract concepts involves some form of classification of experience for which sensory experience is insufficient, in itself, as a basis for accurate categorization. Further organization beyond the purely perceptual level, is required before adequate conceptualization can occur.





## VI. DESIGN OF THE STUDY

Thirty matched pairs of students were selected from the population of grade six students in the Edmonton Separate Schools, June, 1964. Pairs were matched on the basis of intelligence, chronological age, and sex. One member of each pair was a good reader as determined by the average reading grade score on the Gates Reading Survey, Form 2. The other member of the pair was a poor reader, as determined by the average reading grade score on the Gates Reading Survey, Form 2. The total sample consisted of 16 female matched pairs and 14 male matched pairs.

The vocabulary subtest of the Stanford-Binet Intelligence Scale, Form L-M, was administered by the investigator in June, 1964. Pupils responded orally. Responses were taped and later transcribed. Quantitative scoring of responses was first completed. Responses were then analyzed qualitatively according to a fivefold classification system. Responses were also weighted in order to compare the quality of over-all performance.

Statistical analysis, utilizing the "t" test, was made of the differences in response between good and poor readers.

## VII. LIMITATIONS

The study is limited in the following ways:





1. The study is limited to an analysis of the oral responses of good and poor readers to the vocabulary subtest of the Stanford-Binet Intelligence Scale, Form L-M. No attempt was made to analyze more specialized vocabularies and knowledge of concepts in such areas as social studies, science, or mathematics.

2. Responses were evoked in a testing situation and are, therefore, limited to a particular context.

3. There are limitations inherent in definition as a process. Defining a word verbally is a highly complex task and the child is limited by his power of expression when asked to give an oral definition of an isolated word.

4. Subjects were matched pairs selected at the grade six level. All generalizations must be evaluated in the light of this limitation.

5. The study does not attempt to investigate the influence of possible socio-economic differences or differences in experiential background.

6. Measures of intelligence and reading ability on which matching was based were in terms of group tests.

#### VIII. SIGNIFICANCE OF THE STUDY

The close connection between vocabulary and the thought processes of the individual has been fairly well established and the importance of studying words in their conceptual use increasingly



recognized in recent years. An analysis such as this one may serve to throw further light on the differences which exist in the thinking of good and poor readers. The results may prove to be useful in supplementing other data concerning the performance of the poor reader. The approach may prove to have some practical use in the classroom as a means of measuring the status of children's concepts.





## CHAPTER II

### A REVIEW OF THE RESEARCH

The review of the literature has been divided into three sections. Part one includes a discussion of concept formation under the following headings: (1) the characteristics of a concept; (2) research on children's concepts; and (3) factors affecting concept development. Implicit in this study is the assumption that individual differences in concept formation in children reveal themselves in vocabulary responses. As a basis for this assumption part two is concerned with qualitative levels and developmental trends as revealed through analyses of the spoken and written vocabulary responses of children. Part three is concerned with research on the relationship between concept formation ability and reading achievement.

#### I. CONCEPT FORMATION

Russell (80) has indicated that the clarity and completeness of a child's concepts provide two of the best measures of his probable success in school work because meaning is fundamental in most school learnings. Concept formation - the acquisition of new basic concepts - appears to take place in children up to the age of fifteen years. The research in children's concept development has been summarized in a number of textbooks on child psychology, for example,





Thompson (93) and Jersild (47). Curti (20), Humphrey (40), Johnson (48), Leeper (54), Russell (80), and Vinacke (97) have presented more general reviews of research in concept development. A number of studies on vocabulary development have implications for the study of concepts. A summary of methods used in the study of children's vocabularies has been presented by Russell (81).

Vinacke (97) and Russell (79) indicate that philosophical influences have a bearing on the psychological interpretation of "concept" today. Terms like "abstraction," "generalizing," and "conceptualizing" derive from philosophy. The psychologist is interested in the behavioural and genetic processes involved in concept formation. However, within the different schools of psychology a tradition of disagreement in regard to the nature of ideas still persists. These differences have been discussed by Scheerer (83).

### Characteristics of a Concept

A concept may be regarded as "a kind of selective system in the mental organization of a person which links previous experience and current states with stimulus objects" (97). Concepts are usually given a verbal name, the name for instance of a stimulus object. However, "a verbal response is merely a label for the internal cognitive system, which, from the psychological standpoint, is actually the concept" (97). A concept is not a word. However, the ideas may be represented in words or terms which pinpoint the major characteristics of the concept itself. Scheerer (83), discussing the symbolic nature of words, writes:



First the sound patterns come to represent something different from what they were as mere sounds. Second the word is an expression of generalizing thought which culminates in genuine concept formation. Concepts are psychologically operative when the invariant relationship between the properties of an object, an action, or an idea is grasped, and when the communality of characteristics that is invariant can be abstracted from a variety of changing aspects. The process in turn makes the word a conceptual symbol. The name for an individual object in daily life does not refer to the specific uniqueness of the object; the name signifies the object as representative of a category - an exemplification of all the possible variations allowed for by its invariant characteristics (p. 126).

Vinacke (97) has summarized five general characteristics of concepts as follows:

1. Concepts are not direct sensory data but something resulting from the elaboration, combination, etc., thereof . . .
2. A corollary of the first property thereof is that concepts depend upon the previous experience of the organism.
3. Concepts are systems within the mental organization which tie together, link or combine discrete sensory experiences . . .
4. It may be inferred that such ties or links are symbolic in nature; that is, the same concept may be invoked by a variety of stimuli. In the human organism, words usually fulfill this symbolic function.
5. On the side of the internal processes of the organism, concepts represent selective factors. An external stimulus arouses a symbolic response, on the one hand, or a symbolic response guides perceptual activity, whichever comes first . . .

"Conceptualizing," in Russell's (80) words, "makes possible rational behavior - exploring, ordering, creating and predicting" (p. 323). Bruner (10) has given the following advantages of categorization: (1) it reduces the complexity of the environment; (2) it is the means by which the objects of the environment are identified; (3) it reduces the necessity of constant learning; (4) it helps provide for direction, prediction and planning for any activity; (5) it permits





ordering and relating of classes of objects and events (p. 12).

### Concepts of Children

Research studies contain much information about the kinds of concepts children tend to know at different age levels and throw some light on the general ways in which concepts are gradually constructed.

Types of Concepts. Russell (79) points out that more studies have been made of concepts typically known by children at various age levels than of any other specific topic in children's thinking. Summaries of research in this area have been made by Russell (79, 80, 81), Vinacke (97), and Thompson (93), among others. These generally include the following categories: mathematical concepts, scientific concepts, concepts of time, concepts of the self, social concepts, aesthetic concepts, concepts of humor, and miscellaneous concepts.

The studies cited in the summaries illustrate that children develop a wide range of concepts. There is overlapping and probably much mutual reinforcement among concepts. Their growth is orderly although any group of children of the same chronological age shows a wide range in their understandings of different types of concepts.

The Development of Concepts. Developmental trends have been observed in the concepts of children as they pass from early childhood to older ages. Curti (19) has suggested that four stages may be distinguished in the gradual growth of concepts:





1. The presymbolic stage: The child has learned to react in a characteristic way to a particular object and perhaps apply a name to it. But all responses occur only when the object is immediately present.

2. Stage of preverbal symbolic behavior: The child may have an idea of a specific absent object. There is no generalization. The mode of behavior is symbolic but not conceptual.

3. Implicit general ideas: Genuine concepts are taking form and abstraction may be distinguished. For example, the child may respond to several mothers in the same way. However, the idea of a class of things is implicit only. The generalization is vague and not logically organized. The child can only answer questions about things in the most concrete and personal way.

4. The stage of implicit generalization: This stage marks the final attainment of true concepts as a gradual development from earlier stages. The child, at this stage, has the ability to formulate the meaning of an object in words. The formulation is concrete, fragmentary, more or less personal at first, and does not become objective and inclusive until late in childhood (p. 160).

Curti points out that the foregoing account, if correct, means that there are no absolutely complete and final concepts. A concept is not a static thing but a constantly growing set of attitudes and ideas, greatly influenced by the particular conditions of the child's life.

Buhler (11) distinguished four general types of concepts that the child develops at different age levels. The first type of concept develops as the child learns to use and understand the commonest words of the language. Through experience with dishes, for example, he learns that there are constant factors and variable ones and he learns to distinguish these. The second type comes in the use of more general categories. The third type involves the growth of causality. Children note that events occur in sequence and acquire insight into a situation. At the fourth stage of development, that



of definition, the child has some concept of order and of genus-species.

The theories of Curti (19) and Bühler (11) emphasize the role of perception in concept formation. Studies by Welch (101) and Welch and Long (102, 103, 104) stress classifying relationships. Working singly and together, Welch and Long have thrown some light on the hierarchical development of concepts. They have studied when and at what rate children normally begin to learn concepts of varying orders. According to these investigators concepts organize themselves into hierarchies of relationships and the child not only learns concepts applying to one class of objects, but also learns that one class may include other classes. This type of abstraction develops from the following simple to more complex levels (101): (1) a preabstract stage at which the child can discriminate and generalize but not at the linguistic level; (2) the first discriminations using language, at about eighteen months; (3) first hierarchy concepts with some verbalization about the twenty-sixth month, e.g., apples and potatoes are foods; (4) second hierarchy concepts at about four and a half years, e.g., food - fruit - apple hierarchy, or people - man - soldier hierarchy; (5) higher-order hierarchies at which time the child can handle from four or five up to eight or nine steps.

In studies involving higher structural phases of concept formation, Welch and Long (102, 103) have noted that development of concepts occurs in two directions: (1) vertical, in which the child moves





from names of particular objects to a first-hierarchy concept, then from two or more first-hierarchy concepts to a second-hierarchy concept, and so on; (2) horizontal, in which a stimulus is classified as belonging to one species in a particular situation, and as within another species in another situation. Development in the vertical direction was found to be less advanced at early ages than growth in the horizontal direction.

In general, Welch and Long (101, 102, 103, 104) contend that concepts may develop early but that the child cannot verbalize about the genus-species relationship for some time after he first understands it. They also hold that the conceptualizing of children seems to develop from simple to more complex levels and concepts organize themselves into hierarchies of levels.

Two systematically formulated theories of mental development of children are those of Piaget (42, 43, 65, 66, 67) and Werner (106). Piaget (41) describes cognitive development in terms of stages, the criteria of which have been defined as follows:

1. Each stage involves a period of formation (genesis) and a period of attainment. Attainment is characterized by the progressive organization of a composite structure of mental operations.
2. Each structure constitutes at the same time the attainment of one stage and the starting point of the next stage, of a new evolutionary process.
3. The order of succession of the stages is constant. Ages of attainment can vary within certain limits as a function of factors of motivation, exercise, cultural milieu, and so forth.
4. The transition from an earlier stage to a later stage follows a law of implication analogous to the process of integration, preceding structures becoming a part of later structures (p. 23).





The stages of cognitive development in terms of their genesis and structures are: (1) Stage One. Sensory-motor operations (birth to one and one-half years): This stage is characterized by the progressive formation of the schema of the permanent object and by the sensory-motor structuring of immediate surroundings. There are six substages in the course of this stage of development. (2) Stage Two. Concrete thinking operations: (one and one-half years to the eleventh or twelfth year). During this period concrete thought processes which are irreversible gradually become reversible and form a system of concrete operations. (3) Stage Three. Formal thinking operations (age eleven or twelve upwards). During this stage the child starts to think in terms of purely logical propositions.

Classifying and serializing have been discussed by Piaget in a number of connections. These activities have also been studied directly by Inhelder and Piaget (42). Classification is seen as having its origins in sensory-motor schemata, not primarily in language. The child's inability to ignore spatial disposition is observed to have a central role in the development of classifying. Inhelder and Piaget maintain that in the young child the "intension" of a class and its "extension" are not differentiated and hence cannot be coordinated. While the child's bondage to temporal succession lasts, the class exists only in so far as objects are physically assembled.



Summaries of Piaget's work have been presented by Vinacke (97), Russell (79), and Thompson (93), among others. Flavell (28) has presented a detailed analysis of Piaget's investigations.

Piaget's views have been subjected to a number of criticisms. In England, Isaacs (44) has questioned some of his results. Hazlitt (36) has suggested that Piaget's claims rest upon two assumptions for which no evidence is given, namely, (1) that thinking can be identified with ability for verbal expression, (2) that the matter of thought is indifferent to the process; that is, if a child cannot think a relation in regard to one subject-matter, he cannot think it in regard to another. As a result of experiments which she herself conducted, Hazlitt concluded that children display a grasp of relations early. She suggested, ". . . from the evidence that is accumulating, it seems likely that there is no age limit in relation to the process of thinking, beyond that imposed by the lack of experience" (p. 360). McCarthy (59) has summarized some of the objections to Piaget's work, particularly in regard to his results concerning language. Specific objections have also been made by Huang (39). On the other hand, a number of studies which confirm Piaget's results have been carried out. A review of validation studies has been made by Flavell (28).

Werner also holds the assumption of developmental levels. In this regard Werner and Kaplan (107) state:





The stage of maturity characterizing an individual or a group must not be conceived statically, as a fixed pattern of operation; it should rather be understood dynamically, as a potential range of genetically graded functions. Mental growth is definable in terms of reorganization due to the inclusion of new forms of operations. This implies that an individual, depending on outer or inner circumstances, may operate at genetically differing levels . . . (1950, p. 101).

Ausubel (2) has noted that general theories of intellectual development, such as those advanced by Piaget and his collaborators, include age-level changes in at least four major areas of cognitive functioning. These are perception, objectivity-subjectivity, the structure of ideas or knowledge, and the nature of thinking or problem-solving (p. 111). He focused attention on those developmental changes in the acquisition and organization of knowledge that affect the learning and retention of verbal material. For example,

1. As children increase in age, they tend to perceive the stimulus world more in general, abstract, and categorical terms and less in tangible, time-bound, and particularized contexts.
2. They demonstrate increasing ability to comprehend and manipulate abstract verbal symbols and relationships, and to employ abstract classificatory schemata.
3. They are better able to understand ideational relationships without the benefit of direct, tangible experience, of concrete imagery, and of empirical exposure to numerous particular instances of a given concept or proposition.
4. They tend more to use remote and abstract than immediate and concrete critical attributes in classifying phenomena, and to use abstract symbols rather than concrete imagery to represent emerging concepts.
5. They acquire an ever increasing repertoire of more inclusive and higher-order abstractions (p. 111).



### Factors Affecting Concept Formation

Russell (80) includes among factors affecting concept formation the nature of the problem presented, the goal of the learner, chronological age, mental age, and the specific experiences of the learner. Vinacke (97) has also summarized some of the conditions which have emerged in experiments dealing with concept formation. As well as age and intelligence, he includes training or experience, socioeconomic status and vocabulary. Russell (79) had indicated:

Concepts often develop slowly out of percepts, memories, and images, and their development is aided greatly by language or other symbols. Since each concept involves differentiation from other unlike ideas and appreciation of common relationships in members of the same class, the factor of insight may operate in concept development. Children seem to reach the generalization necessary for a concept through inductive thinking in which they have some help in discovering the generalization. They may also use deductive thinking in verifying or strengthening the structure of the concept (p. 162).

In summary, it is not clear whether an ability to acquire and use concepts can be meaningfully defined apart from other intellectual functions. However, a survey of research indicates that the growing child interprets his sensory experiences in an increasingly complex fashion. He is not a passive recipient of sensory information. Rather he is a selector and an integrator who is in a process of continuous change on the basis of maturing structures and prior sensory-perceptual experiences (93).





## II. QUALITATIVE DEVELOPMENT IN VOCABULARY RESPONSES

Studies of the nature of vocabulary responses date back to the second half of the nineteenth century. In 1869 a Berlin pedagogical periodical asked teachers of that city to determine concepts possessed by children entering first grade and called attention to the variation which might be expected between the concept of urban and rural experiences. Hall (35) presents the findings of these teachers concerning 2,238 children. About 90.26 per cent of the children had a concept of "dwelling," about 11.22 per cent understood "river," and about 11.96 per cent had a concept of "lark." He found them saying, for example, that oats came from oaks, butter from buttercups, and apples are dug from the ground. His study revealed the vague and half-assimilated impressions that children have of some of the most common objects with which they come in contact.

Barnes (5) made a comprehensive study of the definitions of children from six to fifteen years of age. Commenting on this study Werner (108) has stated:

His (Barnes') findings present an impressive picture of the ontogenetic decline of definitions formulated in terms of concrete action from 82 per cent at the six-year level to 33 per cent at the fifteen-year level. It is worthy of note that even in children of ten years of age, more than 50 per cent of the definitions of thing-names are still in terms of concrete action (p. 188).





A study of growth in general meaning vocabulary was conducted by Chambers (17) as early as 1904. He secured from 2,922 children and young people from five to twenty-seven years of age, answers to the question, "What do you mean by the words, 'monk,' 'peasant,' 'armor,' 'nation,' 'school'?" He found that definitions of words could be classified under four headings: (a) no answer, signifying absence of content; (b) wholly wrong; (c) vaguely right, i.e., having one or more correct features; (d) correct. An analysis of responses in terms of age levels led Chambers to conclude that a wave of development was indicated in the following order: no content, wrong content, vague content, correct content. He indicated that an individual does not always have a wrong content for a new word before he gets a correct content, but when one has a wrong meaning for a word this stage is intermediate between no meaning and a vaguely right meaning. Chambers found a common source of error to be "euphonic analogy" which was based on the similarity in sound of the response given to the particular word presented, e.g., "monkey" in response to the word "monk." Further he indicated that in the early years of life the individual has an accurate knowledge of only those things which are most immediate and familiar and that in studying the development of the child's use of language the most fruitful field is found in an analysis of the quality and expansion of vocabulary during the years of school life (p. 37).

In 1907 Kirkpatrick (50) indicated that growth with age occurs



not only in range of vocabulary but also in the character of the definitions attached to words. He reached the following conclusions as a result of analytical studies of definitions given by subjects of different ages:

Descriptions which are so common in the high school and college papers are rarely or never given by children in the kindergarten and primary grades. The same is true of definitions by synonyms and inclusions under larger terms. The younger children nearly always define by mention of some specific incident, e.g., "a chair is to sit on"; "baby stands up in a chair"; "a bee goes around a piazza and makes a noise." What anything can do, or what can be done to it, or with it, is of most importance in early knowledge of all things, hence we find the definitions of children expressing action and use more than anything else .... (p. 17).

About the same time Pohlmann (68) also studied the meanings of words given by school children. Many of the definitions given by the younger children were in terms of concretely contextualized action. For example, children between the ages five and six gave the following definitions for "bottle": "There's lemonade in it"; "Where you put water"; "When a little boy drinks milk out of it." In contrast, older children defined "bottle" in the following typical ways: "That's a hollow, round glass vessel into which one pours drinks," (child of 12.0); "A container into which all kinds of liquids go," (child of 13.0). The definitions of the older children indicate a movement away from the defining of words in terms of action contexts toward definition in terms of relatively context-free, general thing-names.

Dolch (23) studying reading and word meanings found that among the types of words causing difficulty for children were those that







acted as symbols for abstractions, as for example, "advantage."

Gray and Holmes (33), in discussing the nature and development of meaning emphasized that

. . . the character of the definitions attached to words changes notably from lower to higher grades. The period from nine to fifteen is particularly productive in the acquisition of meaning (p. 17).

A study carried out by Baranyai (4) in 1939-1941, but not published until 1958, throws further light on the nature of children's verbal comprehension as shown in oral definition. Baranyai tested 556 children, aged eight to ten years, on words and phrases selected from the children's school books in the Szeged area in Hungary. She quotes evidence which is interpreted to show a progressive development in children's thinking from the concrete to the abstract. She noted that a tendency of the age eight to ten groups is a simplifying or reducing of the level of the original meaning of an expression. Errors of interpretation occurred when interpretation was based on sound analogies. One group in the study was retested in the same list a year later. A comparison of responses showed that in many cases interpretations were on a higher level in the second year. For example:

Describing the meaning of action instead of its simple motor function: "The farmers are busy in the fields"; 'busy' is explained in the

first year  
they sow

second year  
they work fast

Attribute or quality substituted for action: "What a milksop John is"; for 'milksop' in the

first year  
he is afraid

second year  
he is a coward (p. 265)



Burns (13) examined a large number of written definitions of secondary school children in Leeds. He based his assessment on criteria of a psychological kind, i.e. definition by emotional tone, definition that associates meaning with a specific situation, and definition of a generic type. A number of the definitions given by the children in Leeds seemed to exemplify regression from a broader concept (which they were unable to explain) to a narrower definition based on experience. For example, "along the embankment" was defined as "place where trains run." Four kinds of definition of the generic type were distinguished: (a) definition stating the class concept; (b) definition implying the class concept; (c) definition stating class and significant characteristics; (d) definition implying class and stating characteristics (p. 38). Definitions of a generic type were deemed to be superior logically and psychologically to definitions in terms of specific content or emotional tone.

In general these studies indicate that children's definitions vary in quality and that growth with age occurs in the level of response.

Many of the characteristic responses of children have been isolated and their developmental levels described, as a result of work done in the area of intelligence testing.

In 1905 Binet and Simon (6) published intelligence tests which included vocabulary tests of both abstract and concrete words. They made the following three distinctions in classifying definitions of





the words fork, table, chair, horse, mama: (1) silence, simple repetition, or designation by gesture; (2) definition by use only; (3) definitions superior to use. They wrote:

As early as four years half of the children define by use only. The number increases a little at five years, and at six we may say that practically all children give definitions of the type. It is not until nine years as we shall see, that the majority of definitions given are superior to use (p. 205).

Terman and Childs (90), in a tentative revision and extension of the Binet-Simon Measuring Scale of Intelligence, arranged a test of 100 words selected from Laird and Lee's Vest-Pocket Webster Dictionary, 1904 edition. They pointed out that no value was attached to the logical form employed in the definition of these words since the test was meant to explore the range of ideas rather than the evolution of thought forms. However, while a qualitative analysis of test results was not done, they stated, "We believe that a qualitative analysis of the verbatim definitions of children of different ages and mentality would be of great value" (p. 206). In 1916, Terman (89) found that children of six, as a rule, defined objects in terms of use. Definitions utilizing "description" (i.e., telling what a substance is made of, etc.) and giving the class to which it belongs, were grouped together as superior to use. He reported that it was not before eight years that two-thirds of the children spontaneously gave a large proportion of definitions in terms superior to use. However, Terman admitted that although the form of the definition is significant, it was not taken into consideration in scoring the test.





Again in 1937, Terman and Merrill (91) wrote,

. . . there are characteristic differences in quality of response for older and younger subjects even on the simpler words. Thus the adult gives a response which classifies a common object but also isolates it by excluding other objects which do not belong to the class. Both a six year old and a sixteen year old know the meaning of orange - "it is round and has seeds" or "it is a citrus fruit" - but their thinking is characteristically different (p. 302).

The same trend was noted by Burt (14). He found that definitions by description or in terms of the class to which a thing belongs are characteristic of older children. Thus the child of six may define horse in terms of action, "it runs, draws a cart," while the child of ten defines it as "an animal."

Wechsler (100) has stated that a test calling for definition of words is often of value because of its qualitative aspects:

Apart from its value as a measure of intelligence, the Vocabulary is an especially desirable test to have on any scale because of its qualitative possibilities. In defining a word a subject gives more than its mere meaning. In many instances he tells a good deal about himself, or at least about the quality and character of his thought processes (p. 99).

Reichard and Rapaport (74) studied the responses of children and adolescents to the Similarities and Differences and other conceptual items of the Stanford-Binet Scale. They found that concrete definitions decreased with age and gave place to 'functional' and then to 'conceptual' types of definitions.



Two classificatory schemes which were eventually developed for use with the Wechsler Vocabulary Subtest and the Binet Vocabulary Subtest have become the foundation for most present day studies of the qualitative level of vocabulary responses.

Two studies with the Stanford-Binet Vocabulary Subtest were made with a view to determining the feasibility of a scoring system which would allow for a qualitative evaluation of responses. In 1928 Marx (58) carried out a qualitative study of the first fifty words of the 1916 Stanford-Binet vocabulary on a group composed of over 1,000 school children and about 200 adults. She classified responses according to categories such as the following for "skill": (1) synonym or synonym type - "ability," "proficiency," "art to do a thing"; (2) interpretation - "able to do things well"; (3) repetition in appropriate context - "play ball with skill"; (4) definition by example - "shoot a bow and arrow straight"; (5) poor explanation - "to do your best"; (6) special aspect isolated - "strength"; (7) failures - "the way you skill." Marx reported that the highest quality types of definition in relation to chronological age were those of the synonym and genus variety, while lowest on the age scale were those definitions using illustration or example, use, and repetition types of response.

The second study utilizing the Stanford-Binet vocabulary was completed in 1931 by Green (34) who analyzed qualitatively the responses of 718 school children and 110 adults to fifty vocabulary





words (45 of which later became the Form L Vocabulary Test of the 1937 Revised Stanford Binet). Green worked out a method of weighted scoring for each word in accordance with the relation between the quality of the response and the developmental level of the subject. The correlation between measures of mental age and weighted vocabulary score standardized against chronological age was found to be .94 for a representative sampling of 150 cases ranging in age from six to eighteen. Although she used a somewhat different qualitative classification from Marx, Green's results followed the same trend. The data of the study led Green to feel dissatisfied with Binet's division of definitions into use and superior to use. As subclassifications in the class "superior to use," Binet considered synonyms, synonyms with modification by use, descriptions and grammatical explanations. However, Green felt that the implications of Binet's method were that all definitions other than in terms of "use" were of a type "superior to use." As a result of her analysis Green devised a system for a qualitative classification of responses. Binet had noted that ages six and seven were characterized by use definitions. Green found that types of definitions with lower median ages than use were description, repetition in context, and demonstration. These last two categories were included in Binet's group of incorrect responses. But whereas "repetition" as Binet conceived it was repetition pure and simple, such as "gown" - "it's a gown," the repetition considered by Green has some modification



which leads the tester to believe the child knows the meaning of the word, e.g., "gown" -- "nightgown." Demonstration when used as a response to eyelash, was deemed more intelligent than when used as a response to table (illustration given by Binet).

As part of her findings Green noted that a characteristic of young children is the perception of a word as a part of a whole and not as a separate entity. Concerning the definition of "rule" she wrote:

The word is bound up in his mind with a mass of concrete ideas. The power of abstraction has not yet developed sufficiently for him to define a "rule" as a "law." For the child of nine a "rule is not to go on the grass or anything." This bears out Piaget's conclusion that ". . . the child can only reason about isolated or about more or less special cases." He cannot generalize from the particular (p. 12).

Green also noted that the tendency of the child to see things in terms of the concrete leads him to look for the source. Thus for the child the idea of "roar" is bound up with the idea of some particular thing that roars, so that for him "roar" means "a sound that a lion makes" or more simply, "a lion roars." That the power to see abstract relations develops with age was borne out by the types of definitions which were characteristic of older children and adults. The synonym was the abstraction most frequently employed by these ages to express the meaning of the word. In cases where the unmodified synonym did not express the exact shade of meaning of a word, the superior adult qualified the meaning by some limitation such as "to burn slightly" for "scorch" (p. 12).





More recently Feifel and Lorge (26), in an analysis of vocabulary, demonstrated that there are developmental differences in growing children. They analyzed the verbatim responses of some 900 children (ages six to fourteen) to the Form L Stanford-Binet Vocabulary Test. They employed a fivefold qualitative system to categorize responses. The system was developed from Green's (34) study. The categories were labelled: (1) Synonym; (2) Use, Description, and Use and Description; (3) Explanation; (4) Demonstration, Repetition, Illustration and Inferior Explanation; (5) Error. Feifel and Lorge interpreted their data as follows:

1. Significant differences were established between the qualitative responses given by the younger children as against those used by the older children. The younger children significantly more often employed the use and description, and illustration, demonstration, inferior explanation, and repetition types of responses, whereas the older children significantly more often used the synonym and explanation types of response.

2. Characteristic differences exist in the thinking of younger children when compared with older children similar in background.

3. Younger children perceive words as 'concrete' ideas and emphasize their isolated or particular aspects, whereas older children stress the abstract or 'class' features of the word meanings (p. 17).

The findings of Feifel and Lorge substantiate the work of Binet and Simon (6) and Terman (89). In addition, they confirm Green's (34) work in showing that use, description, repetition and demonstration types of response are more characteristic of younger than of older children.





The second classification system which is used in present day studies was developed for use with the Bellevue-Wechsler Intelligence Test. Reichard, Schneider and Rapaport (73) used the Goldstein-Weigel Color Sorting Test as an instrument to study concept formation in children. The authors concluded that three methods of forming concepts were indicated: (1) the concretistic, (b) the functional, and (c) the conceptual. Gerstein (30) hypothesized that the same three methods used to solve a performance problem could be used in classifying definitional levels evoked by a verbal stimulus. She worked out a systematic method for appraising and extending the Bellevue-Wechsler vocabulary responses based on three different types of response:

1. The concretistic or descriptive method. This represents the most primitive level of verbalized definition. It implies memory of an object at the concrete, sensory level. For example, "an apple is red." The "red" refers to a visual memory response to a concrete apple. . . .

2. The functional or usage method. This represents a more complex method of verbalizing a definition. A word is defined by the subject recalling the use to which that object was put in the past, e.g., "an apple is something you eat," or "a donkey is something you ride on." . . .

3. The categorical and conceptual method. This represents the abstract method of definition . . . "An apple is a fruit" is a conceptual definition whose modus operandi is more complex than the descriptive or functional methods (p. 368).

Chase (18) used Gerstein's technique of measuring three levels of concepts to test fourth, fifth and sixth grade pupils' concepts associated with verbal symbols in arithmetic. Chase concluded that students' responses "illustrate a preference for definitions at one level of concept formation over other stages, the preferred level



corresponding with progress in the development of concepts." He hypothesized that this approach could be of value in measuring the status of children's concepts associated with terms specific to other academic areas as well.

Two studies enlarged the scope of the Feifel and Lorge (26) research by investigating qualitative levels of response in the recognitive situation. These studies were concerned with the question: "When a child has several alternative meanings before him, which level of meaning, concrete, functional or abstract, does he choose as the "best" meaning?" The question was investigated by Kruglov (52) using a two-word multiple-choice recognition test in grades three, five, seven, eight and with college students. She found in the higher grades an increasing choice of synonyms and a decreasing use of repetition, illustration, inferior explanation responses, but no significant difference between grade levels in use, description, or explanation types of choices. Russell and Saadeh (82) also explored children's choices but in categories different from those used by Kruglov. The authors explored changes in responses to a test of forty items selected from the Thorndike list. Four types of choices were offered: a functional definition, a concrete definition, an abstract definition, and an incorrect definition. The test was given to 257 third, sixth and ninth grade pupils and revealed a definite decrease in choice of concrete definitions and increase in functional and abstract choices at each higher level, and especially between grades three and six. Russell and Saadeh concluded:







Children's vocabulary abilities should probably be scored for breadth and depth of meanings and level of definition selected as "best", as well as by purely quantitative measures (p. 173).

In summary, the studies cited indicate that there are characteristic differences in the quality of response between older and younger children when they are defining words. Young children tend to interpret words in a concrete sense whereas older children tend to stress the abstract features of word-meanings.

### III. READING AND CONCEPT FORMATION

Numerous studies have been made in regard to the development of children's concepts in general, but experimental evidence on the relationship between concept formation and reading is still limited. The findings which have been made to date, however, have been significant.

At the fourth grade level Jay (46) completed a factorial analysis of the nature of reading tasks using the scores of two hundred children who took a battery of thirty-four reading tests and a spelling test. The Thorndikes' (96) study of Primary Mental Abilities at the eighth grade level had yielded a factor which was designated  $X_3$  since no interpretation seemed clear. The verbal nature of the factor was recognized however. Jay tested the hypothesis that  $X_3$  is a reading factor. A summary of observations from the Thorndikes' data was presented by Jay as follows:



1. Nearly all the tests in which the score was based in part on the accuracy of reading a single word in isolation, had significant loadings on  $\underline{X}_3$ . All of the "reading" tests had some  $\underline{X}_3$  loading; but Proverbs, Absurdities, and Paragraph Recall did not.

2. Not all of the  $\underline{V}$  tests measured  $\underline{X}_3$  to a significant degree (Paragraph Recall and Proverbs, for example).

3. Some tests in which the reading of a single word in isolation was involved, had higher loadings on  $\underline{X}_3$  than on  $\underline{V}$ . (Examples are Verbal Enumeration and Word Checking).

4. Incomplete words, which was meant to be a spelling test, had significant loadings on  $\underline{X}_3$  and no loading on  $\underline{V}$ . It therefore represents one of the purer tests of the former ability.

5. Sex was related to  $\underline{X}_3$  in the same direction as sex is related to reading disability. That is, there was a slight, though not highly significant, tendency for girls to excel at  $\underline{X}_3$  tasks.

6. The non-reading tests which measured  $\underline{X}_3$  were of a type which seemed to bear some relation to the reading aptitudes of children and which differentiate among adults . . .

7. Although the  $\underline{X}_3$  factor was uncorrelated with Verbal ability, most of the  $\underline{V}$  tasks had some  $\underline{X}_3$  in them.  $\underline{X}_3$  and  $\underline{V}$  were both positively correlated with the number factor, however. Since the reading of numbers should have something in common with the reading of words, this fact appears to be of interest . . . (p. 8).

Jay identified  $\underline{X}_3$  as a reading factor requiring classification ability. She concluded that classifying words may be an essential task in reading. While some children in her study could read the words, still they had trouble classifying them, and in proportion to their decreasing reading scores.

Braun (8), in a study which grew out of the work of Jay, examined the relationship between concept formation ability and reading achievement at the developmental levels represented by boys in the third, fifth, and seventh grades of the Oak Park (Michigan) Public Schools. As a measure of concept formation, Braun used a test consisting of twenty concepts with six cards per concept. Four words





were typed on each card, and each of the cards had one word that had something in common with one word on each of the other cards.

Ability in concept formation was found to be more closely related to reading achievement at the fifth and seventh grades than was intelligence. Data from the experiment were further interpreted as follows:

1. The work of Jay was supported in the finding that the reading factor is concept formation ability, and the work of the Thurstones was also supported in the finding that there is a factor (named by Jay) that is relatively independent of intelligence as presently measured.
2. The handicapped reader (of normal intelligence) represents a special population in concept formation ability and is relatively deficient in this probably independent cognitive process.
3. Certain children apparently reach an asymptote in concept formation ability at the end of the early elementary years that may account for an asymptote in their reading at the end of the primary stages.
4. Continuous growth in reading despite differences in factors found to be necessary for success at different grade levels may be attributable to the possibility that various stages in reading tap correspondingly advanced stages in the concept formation process.
5. Use of intelligence tests as the basis for expectancy seems questionable since the practice is followed with the very children in whom intelligence and reading are least closely related (p. 682).

In an earlier study, Kress (51) explored differences between severely retarded and achieving readers in ability to form concepts or conceptualize. Twenty-five pairs of boys between the ages eight years and eleven years, eleven months, of normal or above normal intelligence, were matched for chronological age, school experience, and intelligence. One of each pair was a non-reader; the other an achieving reader. On concept formation tests, the non-readers were





distinguished from the achieving readers by a greater concentration of the following characteristics: in approaching the new conceptual task they lacked adequate labels for common concepts; they lacked adequate concepts for dealing with language, especially reading; they exhibited a dependence upon physical characteristics of objects; and they tended to be more concrete and less abstract in their conceptual functioning.

Research in the area of reading suggests that the good reader characteristically interprets stimuli on a higher abstract level than does the poor reader. Burks and Bruce (12) analyzed the performance of thirty-one poor readers and eleven good readers on the Wechsler Intelligence Scale for Children. The average I.Q. for the good readers was 117; that for the poor readers was 101. The scores for the poor readers tended to be high on Comprehension, Block Design, and Picture Arrangement, tasks which the authors suggest have as their common elements a "relative lack of need for long or short term symbolic memories," and "the immediate availability of a structured stimulus" (p. 491). The scores of the poor readers were significantly lower on the subtests which required a higher level of abstraction, i.e., Arithmetic, Information, and Coding. As a group the poor readers did not handle abstractions as well as did the good readers.

Jan-Tausch (45), studying 170 children in the fourth to the seventh grade, also found that good readers were characterized by abstract thinking and that poor readers demonstrated concreteness in behaviour.



A study of twenty-five average readers and twenty-five good readers was made at the grade four level by Wickens (109) in order to determine the relationship between the ability to abstract and ability to read. The following battery of tests was administered: Wepman Auditory Discrimination Test, The Raven Coloured Progressive Matrices, Word Grouping and Figure Grouping subtests of the Primary Mental Abilities Tests, Similarities subtest of the Wechsler Intelligence Scale for Children, Shure-Wepman Concept Shift Test (an extension of the Goldstein-Scheerer Color Form Test) and Object Sorting Test (Rapaport's modification of the Gelg-Goldstein-Weigl-Scheerer Sorting Test). The average readers were able to abstract significantly better than poor readers, both in performance on manipulative tests and on verbal tests. The differences in verbalizing the categorizing principles were found to be significant.

Because experimental evidence in regard to the relationship of concept development to reading success is still limited, no decisive conclusions can be drawn at this time. The data that is available, however, would seem to indicate that the poor reader tends to think of words in their specific rather than generic sense, and lags behind the good reader in the ability to form categories and thus to conceptualize.

#### First-Hand Experience

Not all concepts can be taught through direct experience. Yet depth and variety of experience are significant for conceptual







development. A few investigators have attempted to measure the relationship between experience designed to develop concepts and reading success.

A significant study was conducted by Cantor (15) to determine the value of excursions to kindergarten children as a means of preparing them for first grade reading. She found that two hundred four concepts were given background experience through nine excursions taken. A correlation was effected between the vocabulary and concept demands of primary reading and the vocabulary and concept supply of nine typical kindergarten excursions. The children who participated in the excursions in kindergarten were also checked for reading readiness and reading achievement in the first grade. From the results of tests administered in the primary year and comparisons made with reading readiness in other schools Cantor concluded that the children who had the excursions definitely profited from their experience.

Several other studies have been made in regard to the relationship of background experience to reading at the primary level (87). In general, however, research is limited on the topic of concept development in relation to curriculum practice in reading.

#### IV. SUMMARY

Part one of this chapter was concerned with a review of some aspects of concept formation. In part two a summary of studies of



the nature of vocabulary responses was presented with a view to examining how these responses may throw further light on the individual's thought processes. Finally, in part three, the relationship between concept formation ability and reading was discussed.





## CHAPTER III

### THE DESIGN OF THE STUDY

In this chapter a description of the sample, the testing instrument, and the testing procedure will be given. The classification of the data will be discussed.

#### I. THE SAMPLE

The subjects of this investigation were two groups of thirty children each from grade six in the Elementary Division of the Edmonton Separate Schools, Edmonton, Alberta. The two groups of children were matched with respect to sex, intelligence, and chronological age. The maximum difference in the I.Q. scores permitted between matched pairs was three points. The maximum difference in the age scores permitted between matched pairs was three months. One group will be referred to hereafter as good readers and the second group will be referred to hereafter as poor readers. The distinction between good and poor readers was arbitrarily established in terms of the average reading grade score on the Gates Reading Survey Test, Form 2. A good reader was defined as a student whose Percentile Rank was above seventy-five in terms of the school system norms for the sixth grade. A poor reader was defined as a student whose Percentile Rank was below twenty-five in terms of the school system norms for the sixth grade. The data used in obtaining



matched pairs were secured from records which had been compiled during the 1963-64 school term for each grade six class in the school system. The records included the following information pertinent to this study: test results, Gates Reading Survey, Form 2; intelligence test score, Otis Self-Administering Test of Mental Ability; chronological age; years in school. Records of a total population of 1414 students were available for this study. The average reading grade score of the Gates Reading Survey was selected as the best available measure of reading ability. The sixth grade level was selected as the most suitable level for testing for the purposes of this study. In the middle grades (four through six) both recreational and functional reading grow in importance and reading becomes intermingled with most other areas of the curriculum. Research indicates that while perceptual ability seems to be more necessary for success in the first and second grades, ability in concept formation may prove to be increasingly important in advanced reading. This age level was deemed suitable as it has been indicated that conceptual classification seems well established at the age of eleven or twelve years (6 ).

The following procedure was used in matching the pairs. The age, I.Q., and sex of each subject whose average reading grade score had a percentile rank above seventy-five according to the system norms was listed. These readers were then matched with readers whose average reading grade score had a percentile rank below twenty-five according to system norms. From the total pool of records this process





yielded thirty matched pairs, fourteen male matched pairs and sixteen female matched pairs.

Both the Otis Self-Administering Tests of Mental Ability and the Gates Reading Survey were administered by the classroom teachers as part of administrative policy. Each set of tests was given at a prescribed time in all schools. As test administration was under the same supervision throughout the schools there is no reason to believe that methods of administration were causative in producing differences in results.

Descriptions of the intelligence test and the reading test follow;

#### Otis Self-Administering Test of Mental Ability

The Intermediate Examination together with the Higher Examination constitute the Otis Self-Administering Tests of Mental Ability, covering the range from the fourth grade to the university. The Intermediate Examination is designed for grades four to nine. The single score which is obtained on this test reflects a considerable emphasis on the use of verbal symbols. Reliability of the test has been determined by means of correlation between different forms of the same test. The coefficients of correlation were found between Forms A and B of the Intermediate examinations as follows:

Group I, Form A first, 215 cases, $r = .953$	.006	avg. .948
Group II, Form B first, 212 cases, $r = .943$	.007	

The values of the probable error of a score determined from these





groups were respectively 2.85 and 2.78 points.

The actual rate of progress of pupils through school is held to be the most appropriate criterion of the validity of this test. The determination of the validity of each item consisted of comparing the number of passes of that item by a group of pupils who were making rapid progress through school with a number of passes of the item by a group of pupils who were making slow progress through school. Only those items were used which showed a distinct gain in number of passes of the rapid progress pupils over the number of passes of the slow-progress pupils.

Concerning the Otis tests Kuder (53) has stated: "For the purpose of prediction of school and college success these tests compare favorably with other measures of general ability ..." (p. 331).

#### Gates Reading Survey

This test is designed for grades 3.5 to 10.5 and measures reading vocabulary, level of comprehension, and speed and accuracy. The test was revised and restandardized in 1957 and the grade and age norms are based on 1957 attainments of representative pupils.

The Speed and Accuracy Test consists of thirty-six paragraphs of substantially equal difficulty, each of which contains a comprehensive exercise to determine whether it has been understood. The time allotted is strictly limited, with the result that the score represents the speed of reading. An accuracy of reading score is also secured; it is the percentage of the exercises attempted which are correct. The



Vocabulary Test consists of sixty-five items, each presenting a key word accompanied by five other words from which the one whose meaning is nearest that of the key word is chosen. The exercises are arranged in order of difficulty. This test measures the range and difficulty level of the pupil's ability to work out the recognition and meaning of words. The Level of Comprehension Test consists of twenty-one passages arranged in order of difficulty. It indicates how complex and difficult a passage the pupil can comprehend with reasonable thoroughness.

Table I presents the background data of the two groups used in this study.

TABLE I  
CHRONOLOGICAL AGE, READING TEST SCORES AND INTELLIGENCE  
TEST SCORES (MEANS\* AND STANDARD DEVIATIONS) OF  
GOOD READERS AND POOR READERS

	Chronological Age			Average		I.Q.	
	(in months)			Reading Grade			
	N	Mean	S.D.	Mean	S.D.	Mean	S.D.
Good Readers	30	143	4.70	7.94	.53	107.43	7.35
Poor Readers	30	143	4.25	5.20	.27	106.50	6.09

\* I.Q. means compared for significance of the difference between means - no significance.  
\* Age means compared for the significance of the difference between means - no significance.





## II. THE TEST

The Vocabulary Subtest of the Stanford-Binet Intelligence Scale, Form L-M, was selected as the most appropriate to the present purpose. This is a test of the recall type consisting of forty-five words graded to difficulty, to which an acceptable definition must be given in order to obtain credit. The test has excellent standardization. The words in the present list were rearranged in the order of their present difficulty for subjects tested in 1950-1954 (92). The test extends downward to the six-year level and upward to the superior-adult level. Terman (91) has pointed out that its interest value is high and it presents a familiar task to the subject. It also contains many desirable feature in terms of ease and quickness of administration.

Feifel and Lorge (26) have indicated that the definitions given to the forty-five words allow qualitative differences in the responses to show themselves. Moreover, qualitative norms for age levels for children aged six to fourteen have been established by Feifel and Lorge (26) with the Stanford-Binet Test. It is recognized, however, that the Stanford-Binet Vocabulary Subtest poses some problems for qualitative analysis. Thus Feifel and Lorge (26) have found that:

...one should bear in mind that not all of the words of the Test permit a full range of qualitative differences to express themselves in the verbatim responses. This is particularly true for the more difficult words in the list. Whereas for a word like 'orange' one can reply with various types of acceptable answers, e.g., 'color' (synonym), 'citrus fruit' (synonym modified), 'you eat it' (use), 'it's round' (description), etc., the correct answers for a word like 'piscatorial' are usually limited to a synonym or synonym-type of definition, e.g., 'pertaining to fishes' or 'fishlike' (p. 4).



The last half of the list was too difficult for both the good readers and the poor readers and the effective length of the list was consequently shortened. However, a sufficient number of responses was secured so that comparisons could be made.

Ricks (76) has pointed out that the composition of the vocabulary test in terms of parts of speech is worth noting and that use and description types of response are given less frequently and easily to verbs and adjectives than to nouns. An analysis of the Binet list indicates that about 70 per cent of the words may be classed as nouns.

The test was administered by the investigator according to instructions in the Manual for the Third Revision (92). Quantitative scoring was first carried out according to Terman's directions. Next all verbatim word definitions were rescored in terms of the fivefold system developed by Feifel (25).

Testing was carried out in June, 1964 in the various schools in which the pupils were located. Students were tested individually in a room provided for the purpose. The test was presented both orally and visually; the list of words was typed on a sheet so that each word could be read by the subject while it was being pronounced by the investigator. Responses were recorded on tape and transcribed within a day by the examiner.

The Manual states that there is little likelihood of success beyond the point where six consecutive words have been failed. For the purpose of this study the examiner continued beyond this point.





Responses beyond this level were scored qualitatively but no credit was given in the quantitative scoring.

#### Quantitative Score

All protocols were scored in accordance with the criteria recommended by Terman (92). In this regard the author (p. 232) indicated that it is important for the examiner to realize that the purpose of this vocabulary test is to determine whether the subject knows the meaning of the word, not whether he can give a completely logical definition. "Awkwardness of expression is disregarded." To minimize bias in the scoring of the protocols, all information on the record blank about each of the subjects, both good readers and poor readers, was masked, so that scoring took place with simply the manual and response sheet before the scorer. Individual scores were then recorded on a chart.

#### Qualitative Score

Following the quantitative scoring all of the verbatim responses were rescored in terms of a fivefold qualitative classification system. Qualitative analysis was carried out according to the following procedure:

1. The definition for each word of the list for each student was copied onto a separate card. Each student was given a code number which was placed on the back of the card for identification purposes.



2. The definitions were then sorted according to the word defined; that is, all the responses for the word 'orange' for example, were put together.
3. Definitions for each word were then classified according to type of response.
4. The category for each word was listed on a chart. Tabulations were made for matched pairs in terms of each word, for each word in terms of category, and for matched pairs in terms of category.

As stated qualitative analysis was carried out according to Feifel's (25) classification system. On the basis of Green's (34) system for classifying the different definitions of words and on the basis of his own investigations utilizing the Form L Vocabulary Test of the Revised Stanford-Binet Tests of Intelligence, Feifel determined that all the variety of different responses given to words in the Stanford-Binet test could be encompassed in five essential or key categories. He referred to the five-fold qualitative classification system as follows:

One category consisted of synonym types of response. Another included use and description types of response. These were combined into one category because they were found to occur at approximately the same developmental level in children. A third category contained the explanation type of response. A fourth one was made up of the illustration, demonstration, inferior explanation, and repetition types of response. These were included together because empirical analysis also indicated that they occurred at about the same developmental level. The final category was composed of all types of error response. The categories were kept uniform for the entire list of words (p. 167).





The categories, with an illustration of each as presented by Feifel and Lorge (26, p. 4), are listed below.

### Fivefold Classification System

#### Synonym Category

- |  |   |
|--|---|
| (a) Synonym unmodified:                      | (a) Orange = a fruit                              |
| (b) Synonym modified by use:                 | (b) Straw = hay that cattle eat                   |
| (c) Synonym modified by description:         | (c) Gown = long dress                             |
| (d) Synonym modified by use and description: | (d) Eyelash = hair over the eye that protects you |
| (e) Synonym qualified as to degree:          | (e) Tap = touch lightly                           |

#### Use, Description, and Use and Description Category

- |                          |  |
|--------------------------|--|
| (a) Use:                 | (a) Orange = you can eat it            |
| (b) Description:         | (b) Straw = it's yellow                |
| (c) Use and Description: | (c) Orange = you eat it and it's round |

#### Explanation Category

- |                  |   |
|------------------|---|
| (a) Explanation: | (a) Priceless = it's worth a lot of money |
|                  | Skill = being able to do something well   |

#### Demonstration, Repetition, Illustration and Inferior Explanation Category

- |                           |                                       |
|---------------------------|---------------------------------------|
| (a) Demonstration:        | (a) For words like tap, eyelash, etc. |
| (b) Repetition:           | (b) Puddle = a puddle of water        |
| (c) Illustration:         | (c) Priceless = a gem                 |
| (d) Inferior Explanation: | (d) Scorch = hot                      |

#### Error Category

(Incorrect Demonstration, Misinterpretation, Wrong Definition, Clang Association, Repetition without Explanation, Omits.)

- |                             |                                 |
|-----------------------------|---------------------------------|
| (a) Incorrect Demonstration | (a) Eyelash = points to eyebrow |
| (b) Misinterpretation       | (b) Regard = protects something |
| (c) Wrong Definition        | (c) Orange = a vegetable        |



- |                                 |                             |
|---------------------------------|-----------------------------|
| (d) Clang Association           | (d) Roar = raw              |
|                                 | Skill = skillet             |
| (e) Repetition with Explanation | (e) Puddle = puddle         |
| (f) Omits                       | (f) When a word is left out |

### Hierarchy of Conceptual Levels

Research indicates that the qualitative categories; Synonym, Explanation, Use and Description, and Inferior, used in this study, represent a hierarchy of conceptual levels. Moran, Moran and Blake (62) have pointed out that studies of language development in children report a progressive growth in "thought" processes from concrete (Inferior category) to "functional" (Use and Description category), to the "abstract" (Synonym category). Studies of concept formation in pathological groups generally report a "deterioration" from the abstract or "categorical attitude" to the "concrete attitude" (p. 125).

Feifel and Lorge (26) observed the ages at which each type of response reaches its peak as children grow. A graphic representation of their data is given in Figure 1.

The later maturing response styles are presumably superior to those popular earlier. The authors note:

It is apparent that at ages six and seven the children give the use and description types of response most often and the explanation types of response least often. At ages nine and ten, the synonym types of response are used most frequently by the children, the use and description types of definition are given less frequently than at ages six and seven, and the explanation type of response is given increasingly more often. From age eleven up, the children very definitely use the synonym types of response most often. They are followed in frequency of use by the explanation type of definition, the use and description kinds of response, and finally the demonstration, illustration, inferior explanation, and repetition types of response (p. 8).





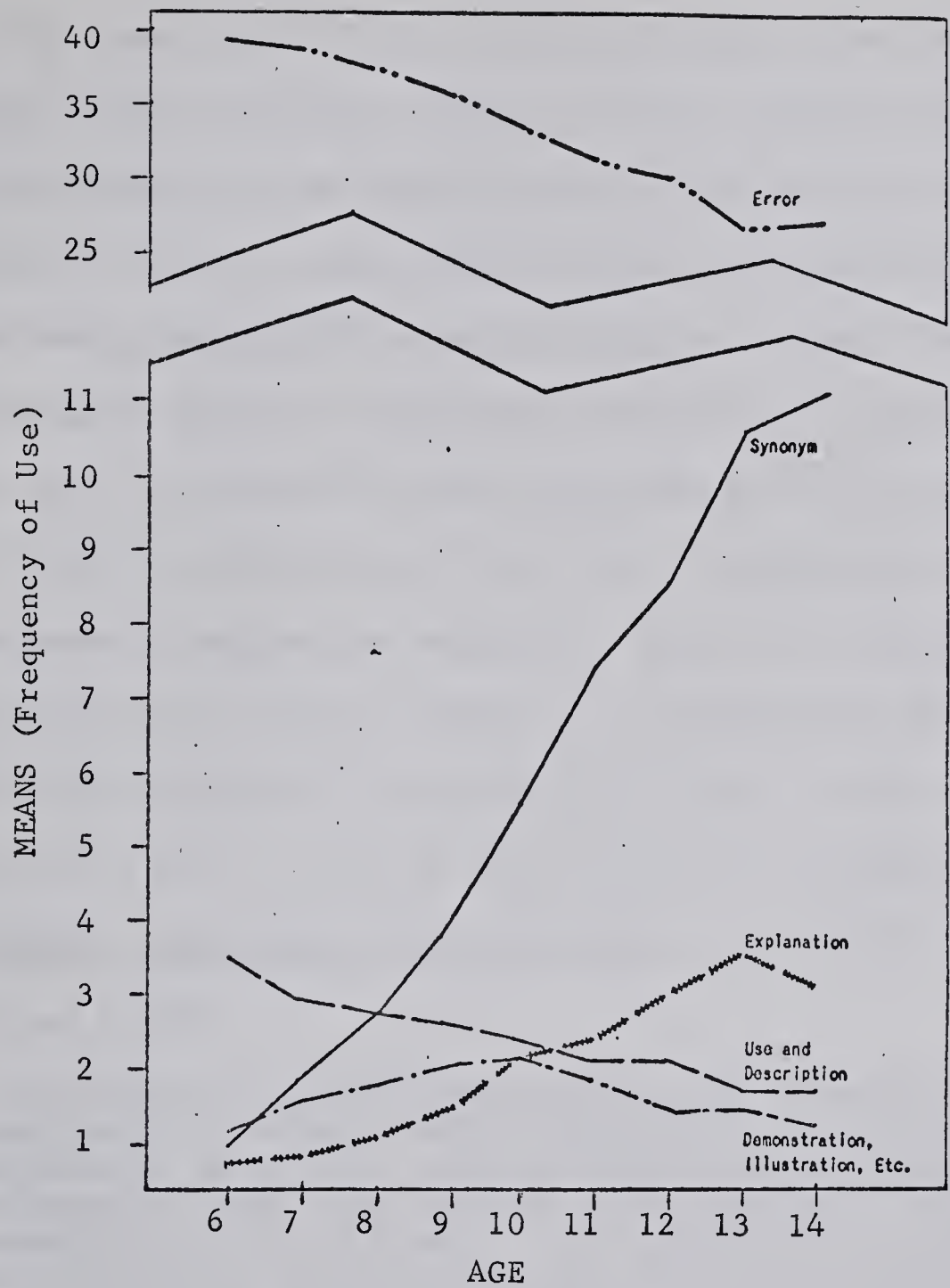


FIGURE 1

MEAN FREQUENCY OF USE OF FIVE QUALITATIVE  
CATEGORIES BY AGE  
(26, p. 9)



The exact level of the explanation category has been open to question in some research. Richman (75) has suggested that looseness and imprecision are characteristic of the explanation response and that it is easier to be imprecise "when explaining" than when establishing a definitely categorical concept or even when applying the relatively clear-cut functional or descriptive approaches. Feifel (25), in a study of normals and abnormals whose ages ranged from fifteen to eighty years, found no well established differences in frequency of explanation responses. Ricks (76), however, confirmed the hierarchy of qualitative patterns. He determined the coefficients of correlation among the five qualitative scores and the quantitative scores of 640 adults tested in the course of the standardization of the Wechsler Intelligence Scale for Adults. He interpreted his results as follows:

The synonym evidently measures the same thing that the quantitative vocabulary score measures and the error score complements these two. Fairly related to these three is the explanation score. The inferior score seems to be quite independent of all the others. The coefficients for the use and description score might merely reflect its comparatively low reliability; however, correlation for attenuation raises these coefficients only .02 and .09. At any rate the direction of the relationships of the use and description score would indicate that it measures more the kind of thing measured by the error score than that measured by the vocabulary, synonym and explanation scores. Feifel and Lorge observed that the synonym type of response matures later than the explanation and that the explanation represents a later stage of development than the use and/or description response. The relationships indicated by (the correlation coefficients) . . . confirm this hierarchy of qualitative response patterns (p. 26).





Ricks also noted the kinds of responses that were given more frequently by abler and better educated people in his sample. The relationship of the qualitative scores to highest grade completed showed synonyms to be superior to explanations, and explanations to be superior to use and description responses. Ricks' results confirmed on this basis the hierarchy observed by Feifel and Lorge.

The hierarchy observed by Feifel and Lorge was adopted for the present study. No changes were made in the main categories or in the subcategories.

#### Reliability of Scoring

The reliability of the qualitative scoring was established through interscorer agreement. Ten cases were randomly drawn and rescored by an independent worker. Definitions were recorded on separate cards for this purpose and no information was provided about the individual cases or concerning the qualitative scores that had been given by the first scorer. Agreements were computed in terms of percentages through the Arrington (1) formula. Accordingly, the responses in each observer's scoring that agreed with the other's (i.e. doubling the agreements) was divided by this total plus the disagreements (responses dissimilarly recorded), or,

$$\frac{2 \times \text{agreements}}{2 \times \text{agreements} + \text{disagreements}}$$
. The per cents of agreement for the

forty-five words of the test were found to extend from 88 to 96 per cent. By standards considered acceptable in the studies analyzed, the



qualitative scoring in this study appears to be satisfactory.

### III. DESCRIPTION OF THE QUALITATIVE CATEGORIES

The following criteria were used for the various categories of the qualitative analysis. The descriptions mainly follow those of Green (34). Additional illustration may be found in Appendix A.

#### 1. Synonym Category

This category includes definitions that are generic in type. The subclassifications within the category are as follows:

- (a) Synonym Unmodified. The response in this subcategory may be in the form of a synonym or substitute term for the stimulus word as cited or it may be a phrase, e.g., "disproportionate" - "out of proportion." The word, "disproportionate" is unmodified in the sense that a part of a phrase would be meaningless to define the word. The response may include the nonspecific object, e.g., "tap something." It may also include definitions beginning "sort of," or "kind of," e.g., "puddle" - "sort of a poor"; "envelope" - "kind of a container." The larger class to which an object belongs may be given, e.g., "orange" - "a fruit."
- (b) Synonym Modified by Use, (c) Synonym Modified by Description,
- (d) Synonym Modified by Use and Description. The modifier





provides further explanation of the synonym. The modifier need not in the strict sense modify the word, it may accompany it. This is the case where it is added when the child is asked to explain further what he means.

(e) Synonym Qualified as to Degree. In this category the qualification gives a more precise shade of meaning to the synonym than the synonym alone affords, e.g., "scorch" - "burn slightly."

## 2. Use, Description, and Use and Description Category

(a) Use. Use includes either action, i.e., the function the word performs, or purpose, i.e., what we do when we execute or perform the word. Definition is usually in the form of a phrase and the meaning is given in terms of use alone. Examples of this type are "what you get water from" for "tap," and "a dog wears it on his mouth" for "muzzle."

(b) Description. Definitions in this category give the physical attributes of that for which the word stands and may include color, shape, size, and substance, e.g., "envelope" - "it's white," "orange" - "it's round and it's juice."

(c) When both use and description are given the definition is qualified as Use and Description, e.g., "gown" - "it's long and you wear it in the evening."

## 3. Explanation

This category includes responses which are explanations of what the given word symbolizes, e.g., "haste" - "when you hurry."



4. Demonstration, Repetition, Illustration and Inferior Explanation Category

This category provides for essentially inferior definitions.

They include:

- (a) Demonstration. This involves designation by gesture, e.g., "eyelash" - pointing to the eyelash.
- (b) Repetition. The test word is repeated with some modification which indicates that the child recognizes and knows the word, e.g., "gown" - "nightgown."
- (c) Illustration. An example is given unaccompanied by explanation, e.g., "skill" - "You are good at arithmetic in school."
- (d) Inferior Explanation. This category refers to an explanation of the test word which is incomplete or very general. Definitions which were over-inclusive or vague are included in this category, e.g., "scorch" - "hot."

5. Error Category

This category provides for the following classifications:

- (a) Incorrect Demonstration. The wrong designation is made by gesture, e.g., "eyelash" - the student points to the eyebrow.
- (b) Misinterpretation. The student defines a substitute word which is physically similar to the stimulus word, e.g., "guard" is defined instead of "regard," "locust" is defined in place of "lotus."





(c) Clang Association. The response is a word which has a sound similar to the word to be defined, e.g., "muddle" in response to "muzzle".

(d) Repetition Without Explanation. The test word may simply be repeated. It may also be accompanied by one or more words but they give no indication that the student knows the meaning of the word.

(e) Omits. These may be broken down into, (i) items to which the student makes no reply; (ii) items which are left out because the student has reached his maximum level; (iii) items to which the student replies, "I don't know."

(f) Wrong Definition. The student is mistaken in his concept of the word.

The system presented provides for five categories of definition "quality." The following scoring principles were used:

1. If the Stanford-Binet vocabulary score was zero, the definition was automatically qualitatively scored in the Error category.
2. If a word was defined at more than one level the "highest" level at which the definition was offered was the one categorized.
3. "Thing" and "something" were generally classified as synonyms when they were modified. However, some of the responses of this type were more immature than others and did not fit into



the synonym category. Burt (14) considered "something you eat with" for "fork" as inferior to "something that you pick up your food with". While this distinction is somewhat arbitrary it seems to correspond with a genuine difference in mental level. Binet (6) considered that the use of the expressions, "It is an object ...", "It is a thing ...", indicated that the definition was less childish than one beginning, "It is to ...". In this study expressions such as the following were put in the synonym category: "tap" -- "it is something that controls the flow of the water." Expressions such as the following were excluded from the synonym category: "orange" -- "something to eat".

#### IV. ANALYSIS OF THE DATA

The "t" test was the basic statistic used for analysis. The level of significance used throughout this investigation was the .05 level.

The following analysis was made of the data:

1. A comparison was made between the quantitative vocabulary scores of good readers and poor readers. The difference between the means of the two groups was tested for significance.
2. The mean number of responses in each category was obtained for good readers and for poor readers based on performance on the total vocabulary test of forty-five words. A "t" test was applied to test the significance of the difference between group means for each category.





3. The number of responses in four categories (Synonym, Use and Description, Explanation, Inferior Response) was determined for good readers and poor readers on the basis of words which both members of each matched pair had correct. The significance of the difference between group means was tested for each category.
4. Performance of good readers and poor readers was compared by means of a system of weighted scores: 1, 2, and 3. This system of weights, which gives credit according to the response, was derived by Green (34). A wrong response receives no credit while a superior response receives more credit than an inferior response. The value of the response was determined objectively by Green according to the age of the subject giving the response. For example, the following definitions for "tap" merited three points: "water valve," "device to draw liquid." The following responses for "tap" received two points: "kind of a rap," "a slight blow." Responses such as the following for "tap" received one point: "You're hitting something very lightly," "a dance." Definitions were weighted as follows:
  - (a) Definitions of matched pairs were weighted on the basis of performance on the forty-five words in the vocabulary subtest. The results were tested using a "t" test.



- (b) Definitions were weighted on the basis of performance on words which both members of each matched pair had correct. The results were tested using a "t" test.
5. The data for boys and girls were analyzed separately. The performance of boys in the upper group was compared with that of girls in the upper group. The performance of boys in the lower group was compared with that of girls in the lower group. Performance of the total group of boys was compared with that of the total group of girls.
6. An analysis was made of the word definition errors of good readers and poor readers.

## V. SUMMARY

In summary, this chapter has presented a description of the subjects used in the study, a description of the test and a description of scoring procedures. An outline of the statistical treatment of the data concluded the chapter.





## CHAPTER IV

### ANALYSIS OF THE DATA

The purpose of this chapter is to present the findings of the experiment. The data are presented in the following order:

1. Characteristics of pupil responses.
2. A comparison between vocabulary raw scores of good readers and poor readers.
3. A comparison between the qualitative vocabulary definitions of good readers and poor readers in terms of five qualitative categories: Synonym Category, Use and Description Category, Explanation Category, Demonstration, Repetition, Illustration and Inferior Explanation Category, and Error Category.
4. A comparison between weighted scores of good readers and poor readers.
5. A comparison between the qualitative definitions of boys and girls.
6. A comparison between types of word definition errors made by good readers and poor readers.

In the discussion which follows, the qualitative category, Demonstration, Repetition, Illustration, and Inferior Explanation, is referred to as the Inferior response category. The relevant statistical findings are presented in the following tables. In Tables II-VI, "t" was computed according to Lindquist (56, p. 58). In Tables VII-XII, "t" was computed according to Ferguson (27, p. 137).



## I. CHARACTERISTICS OF PUPIL RESPONSES

No particular type of definition response was given exclusively by one group. The synonym responses constitute the largest component of the total vocabulary scores of both good readers and poor readers. The poor readers gave a greater mean number of use and description and inferior responses. The good readers, on the other hand, gave a greater mean number of synonym and explanation responses. The following examples illustrate some of the characteristics of the verbal responses which were obtained in this study.

Qualitatively different levels were evident in the responses of the good readers and poor readers. The good readers gave more definitions of the following kind than did the poor readers: e.g., "roar" - "a loud forceful noise"; "priceless" - "invaluable"; " juggler" - "a performer"; "peculiarity" - "something odd." The poor readers gave more definitions of the following type than did the good readers: "straw" - "it makes hats"; "envelope" - "to put letters in"; "lecture" - "it's like a report or a story, or something like that"; "skill" - "it's a sort of a course, it is a special thing."

The responses of both groups were characterized by phrases such as, "a kind of," "sort of," e.g., "lotus" - "sort of a flower"; "tap" - "sort of knock"; "puddle" - "sort of a, not a very big hole." Such formulae, according to Burns (13), seem to argue an awareness of the need for a generic definition, and may be an attempt





to bridge the gap between the general and the specific.

Both groups had a number of partially developed concepts. Many of the inferior explanations showed that the word was not unknown to the student but his responses were vague and the word was beyond his power to define with much precision, e.g. "skill" - "you do it, how you do it." The presence of responses of this type suggests that students need help in rounding out partially developed concepts.

In a number of cases the distinction between parts of speech seemed to break down. For example, the pupils defined "juggle" instead of "juggler," "hasten" instead of "haste," "skillful" instead of "skill." This behaviour may be due to lack of precision on the part of the students. On the other hand Werner (108) attributes it to the following cause:

As the child advances towards cognitive tasks of a higher order, involving new operations, the principle of spirality is again manifested . . . Thus when the child undertakes the operations involved in defining a verbal concept given in isolation and later on in forming relations between verbal concepts -- his linguistic activity at each of these higher levels of functioning is again, at the outset, global, diffuse, and concretely contextualized. In other words, as the child seeks to realize new demands, he again begins in a relatively primitive manner: for example, he dissolves distinctions such as that between thing-name and action-name, which were long since established in genetically earlier activities (p. 188).

In either case this type of behavior would seem to argue the need for direct training for precision in expression.

The types of errors made by good and poor readers serve to throw further light on their thinking processes. "Clang" or verbal



association errors were made by both groups. For example, the response to "scorch" was "scratch," and to "shrewd" the response frequently given was "rude." Chambers (17) attributed this type of error to euphonic analogy. Such responses occur when the child thinks that the meaning of a word is conveyed by its sound pattern. Clang association represents a response at the concrete level, and its presence in the speech of both groups indicates that the problem, although not a major one, is fairly general. Some of the errors made by good and poor readers are related to particular associations with the stimulus word, e.g., "tolerate" - "can't stand." Others occurred when the pupils were "miscued" by some part of the word, e.g., "priceless" - without price.

## II. QUANTITATIVE ANALYSIS

Table II presents the mean difference and the significance of the difference between vocabulary raw scores of good and poor readers. As might be expected there is a significant difference between the scores of the two groups. The standard for passing for a twelve year old on the vocabulary subtest of the Stanford-Binet Scale is a score of fifteen. Both groups in this study have a mean chronological age of eleven years, eleven months. Table II indicates that the good readers are generally superior in performance with a mean vocabulary raw score of 17.23. The poor readers are below average in their performance on the vocabulary test with a mean vocabulary raw score of 13.73. The superiority of good readers over poor readers in





TABLE II

DIFFERENCES BETWEEN QUANTITATIVE VOCABULARY SCORES OF MATCHED  
PAIRS OF GOOD READERS AND POOR READERS

Possible Score	Good Reader (N = 30)		Poor Reader (N = 30)		Mean Difference	S <sub>MD</sub> <sup>**</sup>	t
	Mean	S.D.	Mean	S.D.			
Quantitative Score	45	17.23	2.85	13.73	2.66	.75	4.67*

\* Significant at .05 level, or higher, t = 1.69.

\*\* Standard error of mean difference.



vocabulary has been demonstrated in a number of studies. Bond and Fay (7), among others, have shown that poor readers are considerably lower in the vocabulary items of the Stanford-Binet Intelligence Test than are good readers of equal intelligence. The students in this study follow this trend.

### III. DIFFERENCES IN QUALITATIVE RESPONSES BETWEEN GOOD READERS AND POOR READERS

#### Total Performance

All the definitions given by each subject were scored for one of the five qualitative levels described earlier: Synonym, Use and Description, Explanation, Inferior, or Error. Qualitative vocabulary scores were thus obtained for each category on the basis of performance on the forty-five words of the vocabulary subtest. The mean number of each type of definition given by good readers and by poor readers is presented in Table III. It is evident from Table III that the good readers gave a greater mean number of synonym and explanation type definitions than did the poor readers. On the other hand, the poor readers gave a greater mean number of use and description, inferior type, and error responses. In order to determine whether there were any significant differences between the types of qualitative definitions given by good readers as against the poor readers to the forty-five words of the vocabulary subtest, the mean differences were obtained for the five categories and evaluation made of the significance





TABLE III

DIFFERENCES BETWEEN QUALITATIVE VOCABULARY SCORES OF MATCHED PAIRS OF GOOD READERS  
AND POOR READERS BASED ON TOTAL PERFORMANCE

Qualitative Category	Good Reader (N = 30)		Poor Reader (N = 30)		Mean Difference	S <sub>MD</sub> <sup>**</sup>	t
	Mean	S.D.	Mean	S.D.			
Synonym	13.40	3.18	9.17	2.75	4.23	.76	5.57*
Use and Description	1.33	1.37	2.27	1.79	-.94	.42	2.24*
Explanation	2.50	1.65	1.67	1.56	.83	.35	2.37*
Inferior	1.10	.98	1.47	.99	-.37	.23	1.61
Error	26.67	2.71	30.43	2.56	-3.76	.70	5.37*

\* Significant at .05 level, or higher, t = 1.69.

\*\* Standard error of mean difference.

- Minus value indicates difference in favor of poor readers.



of these differences. Table III includes the results for thirty good readers and thirty poor readers matched on age, I.Q., and sex.

The findings indicate that the good readers give the synonym type of response significantly more often than do the poor readers. The difference is significant beyond the .05 level on a one-tailed "t" test. In the same manner the poor readers give the use and description types of response significantly more often than do the good readers, the difference again significant beyond the .05 level on a one-tailed "t" test. The good readers give the explanation type of response significantly more often than do the poor readers, the difference being significant beyond the .05 level. The difference in the number of inferior responses does not approach a confidence level, although the trend is in the predicted direction. A highly significant difference was found between the qualitative scores of good readers and poor readers in the error category. This was expected as the vocabulary raw scores differed significantly, thereby indicating a wide discrepancy between the two groups in the number of words known.

In summary, when the responses of good readers and poor readers to the forty-five words of the Stanford-Binet Vocabulary Test were analyzed, significant differences in qualitative scores were obtained for each of four categories: Synonym, Use and Description, Explanation, and Error Category. The difference in the number of inferior responses was not significant, although the poor readers gave more responses of this type than did the good readers. In their performance on the





forty-five words of the subtest the good readers tended to stress the abstract or "class" features of a word significantly more often than did the poor readers. Conversely, the poor readers tended to perceive words as "concrete" ideas significantly more often than did the good readers.

### Selected Responses

The above classification gives an advantage to the good readers who know more word meanings. Moreover, the total scores received were determined as a result of getting different words correct. Scores were therefore recomputed for each category on the basis of words which both members of a pair had correct. The question was then raised, "When their scores are based on getting the same words correct, will qualitative differences in the types of response appear between matched pairs of good and poor readers?" The mean scores for each category were obtained for each group. These are presented in Table IV. The findings in Table IV show that the good readers gave a greater mean number of synonym type and explanation type responses than did the poor readers. The poor readers gave a greater mean number of use and description and inferior type responses.

In order to determine whether any significant differences exist in the quality of definitions of good and poor readers when scores are determined on the basis of getting the same words correct, the mean difference was computed for each category for good and poor readers and the significance of the difference tested by means of the



TABLE IV

DIFFERENCES BETWEEN QUALITATIVE VOCABULARY SCORES OF MATCHED PAIRS OF GOOD READERS AND POOR READERS BASED ON CORRECT RESPONSE TO IDENTICAL ITEMS

Qualitative Category	Good Reader (N = 30)		Poor Reader (N = 30)		Mean Difference	S <sub>MD</sub> <sup>**</sup>	t
	Mean	S.D.	Mean	S.D.			
Synonym	9.73	2.17	8.17	2.54	1.56	.49	3.18*
Use and Description	1.03	1.28	2.17	1.69	-1.14	.44	2.59*
Explanation	1.43	1.26	1.33	1.35	.10	.27	.37
Inferior	.67	.83	1.27	1.12	- .60	.23	2.61*

\* Significant at .05 level, or higher, t = 1.69.

\*\* Standard error of mean difference

- Minus value indicates difference in favor of poor readers.





"t" test. The results are presented in Table IV. It may be seen that the good readers tend to give significantly more synonym type definitions than do the poor readers, the difference being significant beyond the .05 level. The poor readers give the use and description types of response significantly more often than do the good readers, the difference being significant beyond the .05 level. There is no significant difference between the explanation type responses of good and poor readers when their scores are determined on the basis of getting the same words correct. The poor readers give a significantly greater number of inferior responses, the difference being significant beyond the .05 level.

Generally, the findings indicate that when their scores are based on getting the same words correct, qualitative differences in the types of response appear between matched pairs of good and poor readers. The poor readers tend to give fewer abstract definitions and more concrete definitions to the Binet vocabulary words than do the good readers.

### Weighted Scores

Various levels of definition are to be found within the main categories used in this study. Some definitions within a category suggest a more fully developed understanding of the concept than others. Green (34) noted in regard to synonym type responses in her study:



The synonym is the abstraction most frequently employed by these ages (older children and adults) to express the meaning of the word. It will be noted that whenever possible the adult seeks the shortest definition while the child is more rambling and descriptive. The synonym in its unmodified form meets this requirement of brevity and conciseness. But not always does the unmodified synonym express the exact shade of meaning of the word. In these cases the superior adult qualifies the meaning by some limitation such as "a light touch" for "tap" or "to burn slightly" for "scorch". For words where such a qualification is possible it will be found to be the most superior type of response. For children in the middle age ranges in whom the ability to abstract is developing but who are still held to utilitarian ideas and imaginal types of thought, the modified synonym is the most common vehicle to express the meaning of a word (p. 13).

In order to credit definitions in proportion to their relative superiority and inferiority, responses to the forty-five words of the Stanford-Binet Vocabulary Test were weighted with values 1, 2 or 3 according to the method devised by Green (34). The mean difference and the significance of the difference were obtained for each group. Table V presents the results. It is evident that there is a significant difference between the quality of response of good and poor readers as determined by weighted scores on the basis of total performance. The difference in favor of the good readers was significant beyond the .05 level.

The value of weighted scores was recomputed on the basis of words which both members of a pair had correct. The results are presented in Table VI. A "t" ratio of 2.79 was obtained, indicating that the difference between weighted scores of good and poor readers is again highly significant.





TABLE V

DIFFERENCES BETWEEN WEIGHTED SCORES OF MATCHED PAIRS OF GOOD READERS  
AND POOR READERS BASED ON TOTAL PERFORMANCE

	Good Reader (N = 30)		Poor Reader (N = 30)		Mean Difference	S <sub>MD</sub> <sup>**</sup>	t
	Mean	S.D.	Mean	S.D.			
Weighted Score	35.07	6.98	25.23	6.04	9.84	1.74	5.66*

\* Significant at .05 level, or higher, t = 1.69.

\*\* Standard error of mean difference.



TABLE VI

DIFFERENCES BETWEEN WEIGHTED SCORES OF MATCHED PAIRS OF GOOD READERS AND POOR READERS BASED ON CORRECT RESPONSE TO IDENTICAL ITEMS

	Good Reader (N = 30)		Poor Reader (N = 30)		Mean Difference	S <sub>MD</sub> <sup>**</sup>	t
	Mean	S.D.	Mean	S.D.			
Weighted Score	23.27	4.60	21.93	5.06	1.34	.48	2.79*

\*Significant at .05 level, or higher, t = 1.69.

\*\*Standard error of mean difference.





In summary, when the vocabulary responses of good readers and poor readers are weighted on the basis of the quality of response, significant differences are obtained between the scores. The results provide a measure of over-all performance of good readers and poor readers in terms of qualitative level. It is indicated that good and poor readers respond at qualitatively different levels.

#### IV. DIFFERENCES IN PERFORMANCES OF BOYS AND GIRLS

Numerous studies support the observation that boys have more difficulty with reading than do girls. Moreover, a sex difference in language development seems to exist in favor of girls (59). In view of these differences the performance of boys was compared with that of girls both for vocabulary raw score and for qualitative levels of definition. No attempt was made to equate the boys and girls according to mental age and investigation of sex difference is carried no further than to report the results of the vocabulary testing. The results for boys and girls in the total group are presented in Table VII. It is evident that there is no significant difference between the two groups in the number of words correctly defined.

The mean vocabulary raw scores for the boys and girls classified as good readers are presented in Table VIII. As indicated by the results in Table VIII the girls in the group of good readers show slight superiority. However, the difference between the mean scores of the boys and the girls is not statistically significant.



TABLE VII  
DIFFERENCE BETWEEN QUANTITATIVE VOCABULARY  
SCORES OF BOYS AND GIRLS

	Possible Score	Boys (N = 28)		Girls (N = 32)		t*
		Mean	S.D.	Mean	S.D.	
Quantitative Score	45	15.61	3.18	15.38	3.33	.270

\* No significant difference found.





TABLE VIII  
 DIFFERENCE BETWEEN QUANTITATIVE VOCABULARY SCORES  
 OF BOYS AND GIRLS, GOOD READERS

	Possible Score	Boys (N = 14)		Girls (N - 16)		t*
		Mean	S.D.	Mean	S.D.	
Quantitative Score	45	16.79	3.36	17.63	2.23	.78

\* No significant difference found.



Table IX presents the mean vocabulary raw scores for boys and girls classified as poor readers.

TABLE IX  
DIFFERENCE BETWEEN QUANTITATIVE VOCABULARY SCORES  
OF BOYS AND GIRLS, POOR READERS

	Possible Score	Boys (N = 30)		Girls (N = 30)		t*
		Mean	S.D.	Mean	S.D.	
Quantitative Score	45	14.43	2.47	13.13	2.67	1.33

\* No significant difference found.

The results in Table IX indicate that the boys have a higher mean score. However, there is no significant difference between the groups.

A comparison was made of the qualitative scores of boys and girls in the total group. The findings are presented in Table X. Significant differences in favor of the boys exist at the .05 level in the use and description category. This suggests that the boys in the total group tend to define words in their particular aspect more frequently than do the girls. No significant differences were found for the other categories.



TABLE X  
DIFFERENCES BETWEEN QUALITATIVE SCORES OF BOYS  
AND GIRLS, TOTAL GROUP

Qualitative Category	Boys (N = 28)		Girls (N = 32)		t
	Mean	S. D.	Mean	S. D.	
Synonym	11.71	3.43	10.91	3.79	.84
Use and Description	1.36	1.26	2.19	1.86	1.96 *
Explanation	2.11	1.72	2.06	1.60	.10
Inferior	1.32	.97	1.25	1.03	.27
Error	28.50	3.33	28.59	3.16	.11

\* Significant at the .05 level,  $t = 1.68$ .





Table XI presents the qualitative scores of boys and girls classified as good readers. As is evident from Table XI no significant differences were obtained.

The qualitative scores of boys and girls classified as poor readers are presented in Table XII. No significant differences were obtained.

In summary, no significant differences were obtained between the quantitative scores of boys and girls. A comparison of qualitative responses revealed a significant difference in favor of boys for the use and description category when responses were analyzed for boys and girls in the total group. No significant differences were found for the other qualitative categories. No attempt was made to equate boys and girls and the findings must be viewed in the light of this fact.

#### V. ERROR CATEGORY

Responses in the error category were further analyzed for patterns which might characterize the thinking of good and poor readers. Errors were categorized according to a sixfold classification: Omit, Misinterpretation, Wrong Definition, Incorrect Demonstration, Clang Association and Repetition Without Explanation. A detailed account of the criteria for the Error category may be found in Chapter III. Table XIII presents the number of errors in each class for good and poor readers. The findings indicate that no



TABLE XI  
DIFFERENCES BETWEEN QUALITATIVE VOCABULARY SCORES  
OF BOYS AND GIRLS, GOOD READERS

Qualitative Category	Boys (N = 14)		Girls (N = 15)		t*
	Mean	S. D.	Mean	S. D.	
Synonym	13.64	3.52	13.19	2.83	.37
Use and Description	.93	1.16	1.69	1.45	1.51
Explanation	2.36	1.54	2.63	1.73	.43
Inferior	1.21	1.01	1.00	.94	.58
Error	28.86	3.29	26.50	2.06	.34

\* No significant differences found.





TABLE XII  
DIFFERENCES BETWEEN QUALITATIVE VOCABULARY SCORES  
OF BOYS AND GIRLS, POOR READERS

Qualitative Category	Boys (N = 14)		Girls (N = 15)		t*
	Mean	S.D.	Mean	S.D.	
Synonym	9.79	1.93	8.63	3.20	1.14
Use and Description	1.79	1.21	2.69	2.08	1.37
Explanation	1.86	1.85	1.50	1.22	.61
Inferior	1.43	.90	1.50	1.06	.19
Error	30.14	2.45	30.69	2.64	.56

\*No significant differences found.



TABLE XIII  
ERROR CATEGORIES OF GOOD READERS AND POOR READERS

		Incorrect	Misin- terpre- tation	Wrong Defi- nition	Clang- Associ- ation	Repe- tition Without Expla- nation	All Error Cate- gories com- bined
Good Readers (N = 30)	686	1	20	83	9	1	800
Poor Readers (N = 30)	777	2	29	94	11	0	913



particular error type is made exclusively by either group. The omit type of error predominates in both groups with approximately 85 per cent of the errors of good readers and 85 per cent of the errors of poor readers falling into this category. The wrong definition type of error is the next most frequently used and constitutes about 10 per cent of the errors of each group. The third type most frequently made by both groups is the misinterpretation type. It constitutes 2.5 per cent of the errors of the good readers and 3.2 per cent of the errors of the poor readers. Errors of the clang or verbal association variety follow. These constitute only a small percentage of the error responses, 1.1 per cent for the good readers, and 1.2 per cent for the poor readers. Errors of the incorrect demonstration and repetition without explanation variety are infrequently given. Similar results were obtained when the responses of boys and girls were analyzed separately. The data are presented in Tables XIV and XV.

The greatest difference between the two groups lies in the number of responses in the omit category. More errors are made by the poor readers because they seemingly have a narrower vocabulary range than do the good readers.

The results were compared with those obtained by Feifel (24), who analyzed the errors of children ranging in age from six to fourteen. He interpreted the means and standard deviations for the six error categories as follows:





TABLE XIV  
 ERROR CATEGORIES OF GOOD READERS AND POOR READERS, BOYS

	Omit	Incorrect	Misin- terpre- tation	Wrong Defi- nition	Clang- Associ- ation	Repe- tition Without Expla- nation	All Error Cate- gories com- bined
Good Readers (N = 14)	315	0	12	46	3	0	376
Poor Readers (N = 14)	358	1	12	46	5	0	422



TABLE XV  
 ERROR CATEGORIES OF GOOD READERS AND POOR READERS, GIRLS

	Omit	Incorrect	Misin- terpre- tation	Wrong Defi- nition	Clang- Associ- ation	Repe- tition Without Expla- nation	All Error Cate- gories com- bined
Good Readers (N = 16)	371	1	8	37	6	1	424
Poor Readers (N = 16)	419	1	17	48	6	0	491





The omit or "don't know" category is the one most frequently used at all ages. As expected, it shows increasing decline as the children become older. The second type of error response most frequently made, at all age levels, is the wrong definition kind. It increases in use up to the age of twelve and declines slightly at ages 13 and 14. The third type of error most frequently made is of the clang or verbal association variety. This type of error declines the older the children become; and from age eleven and on is employed about equally as often as the misinterpretation category. The misinterpretation type of error is next in frequency of use. It is infrequently given, and is made about equally often at all age ranges. The errors most infrequently given, at all ages, are the incorrect demonstration types. These evidence no appreciable change with increasing age (p. 67).

The findings for this study differ from the foregoing in that the third type of error most frequently made is the misinterpretation type rather than clang or verbal association kind as reported by Feifel (24). The errors of good readers and poor readers are similar in type. The main difference is one of frequency.

## VI. SUMMARY

This chapter has presented the findings of the testing program. The performance of good and poor readers was compared in terms of vocabulary raw score, in terms of qualitative levels of response, and in terms of weighted scores. The performance of the boys in the sample was compared with that of the girls. The one-tailed "t" test was employed to ascertain statistical significance. The types of errors made by good and poor readers were discussed.



## CHAPTER V

### CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

The present study was designed to test the hypothesis that there is a significant difference in the qualitative level of vocabulary responses of good readers and poor readers.

The group used for this study consisted of thirty pairs of grade six students matched on the basis of age, sex, and intelligence. One member of each pair was a good reader and the other a poor reader as determined by the average reading grade score on the Gates Reading Survey, Form 2. The vocabulary subtest of the Stanford-Binet Intelligence Scale, Form L-M was administered and oral responses were recorded on tape. The quantitative scores were determined according to Terman (92). All the verbatim responses were then qualitatively analyzed by means of a fivefold qualitative classification system. Statistical analysis, utilizing the "t" test, was made of the differences in qualitative scores. In order to credit definitions within each category in proportion to their relative superiority or inferiority, responses were weighted. The mean difference and the significance of the difference between weighted scores of good and poor readers were obtained. The performance of the boys was compared with that of the girls in order to determine whether the level of response was related to sex difference.





In the present chapter the conclusions are presented in terms of their relation to the null hypotheses. A discussion of the specific limitations of the findings is presented next. This is followed by a review of possible implications of the findings and recommendations for further research.

## I. CONCLUSIONS

### Hypothesis 1

That the good reader does not produce significantly more synonym or class type responses than the poor reader.

The synonym responses constituted the largest component of the total vocabulary score of both good and poor readers. This was expected as it has been indicated by Feifel and Lorge (26), Burns (13), Kruglov (52), and Russell and Saadeh (82), that the commonest form of definition among children aged nine or over is definition by synonym. However, the findings of this study indicate that the good readers gave a significantly greater number of synonym responses than did the poor readers to the forty-five words of the vocabulary test. Similar results were obtained when analysis was made on the basis of words which both members of a matched pair had correct. The results are interpreted to indicate that the good reader tends to be more general and abstract in his verbal responses than the poor reader. Cognitively, he tends to be more mature. In view of the findings the null hypothesis was rejected.





### Hypothesis 2

That the poor reader does not produce significantly more use and description type responses than the good reader.

The null hypothesis was rejected. The findings indicate that the poor readers gave a significantly greater number of use and description type responses to the forty-five words of the vocabulary subtest. Significant differences were also obtained when the two groups were compared on the basis of words which both members of a pair had correct. The findings confirm those of Kress (51) who found that poor readers tended to be more concrete and less abstract in their responses. The poor readers in this study based a greater number of their responses on the perceptible properties of objects than did the good readers and tended to respond more often in terms of particularized contexts.

### Hypothesis 3

That the good reader does not produce significantly more explanation type responses than the poor reader.

A significant difference was obtained in the explanation category when good readers and poor readers were compared on over-all performance. The null hypothesis was therefore rejected when results were based on performance on the forty-five words of the vocabulary subtest. When results were based on responses which both members of a pair had correct, no significant difference was found for the explanation category. The null hypothesis was not rejected when results were determined on this basis. An item analysis revealed that the good readers



frequently gave explanation responses to the more difficult and abstract words for which no response was given by the poor reader.

#### Hypothesis 4

That the poor reader does not produce significantly more inferior type responses than the good reader.

Although the trend was in the predicted direction no significant differences were obtained in the inferior category when results for good readers and poor readers were based on over-all performance. The null hypothesis was not rejected when results were obtained on this basis. When a comparison was made between responses which both members of a pair had correct, significant differences were evident. The null hypothesis was rejected when results were obtained on this basis.

#### Summary of Conclusions from Hypotheses

The data were interpreted to confirm the general hypothesis that there is a significant difference in the qualitative level of vocabulary responses of good and poor readers. The good readers gave significantly more synonym type responses while the poor readers gave significantly more use and description type responses. The results obtained for the explanation category indicated a significant difference in favor of the good readers when scores were determined on the basis of total performance. This difference did not hold when scores were determined on the basis of words which both members of a pair had correct. No





significant difference between good readers and poor readers was obtained when inferior responses were determined on the basis of total performance. However, a significant difference in favor of the poor readers was obtained for this category when scores were determined on the basis of words which both members of a pair had correct.

The findings lead to the conclusion that significant differences in conceptual level of vocabulary performance may be demonstrated between the subjects classified as good readers and poor readers. Differences in the conceptual level of definition favor the good reader.

#### General Conclusions

The findings of this study indicate that the vocabulary responses of good and poor readers differ significantly in quality as well as in range.

No particular type of definition was made exclusively by either group in this study. However, the good readers gave a significantly greater number of abstract responses. Qualitative differences were also indicated by differences in weighted scores. The results suggest that the good readers in the sample tend to conceptualize on more complex levels than do a matched group of poor readers. The poor readers tend to perceive more words as concrete ideas and to generalize less from the particular. The findings of this study thus follow those of Kress (51), Burks and Bruce (12), and Jan-Tausch (45).



Concerning abstract cognitive functioning, Ausubel (2) has written:

A sufficient body of abstract ideas that are clear and stable is obviously necessary before he (the child) can hope efficiently to manipulate relationships between them so as to develop meaningful general propositions (p. 120).

The evidence concerning the poor reader suggests that he may be handicapped by the concreteness which was demonstrated in his verbal behavior.

When the scores for boys and girls were compared, significant differences were indicated in one category only, i.e., use and description. This finding suggests that boys tend to give more concrete responses than do girls. However, the results must be viewed in light of the fact that except for grade in school, background variables were not controlled. A review of responses categorized as errors revealed that the same kinds of errors were made by both good readers and poor readers. The omit category was the one most used by both groups.

The findings of this study suggest that some clarification of the child's level of thinking may be obtained through a qualitative analysis of vocabulary responses. Pupil's verbatim responses may profitably be analyzed in terms of the kind and quality of definition given as well as in terms of the correctness or incorrectness of the response.

## II. LIMITATIONS

The results of this study must be viewed in the light of certain limitations. These are concerned in part with the process of qualitative





analysis. Despite attempts to make the scoring instruction as precise and explicit as possible a certain amount of subjectivity was unavoidable. It was found that children's definitions take a variety of forms at this age and there is difficulty in distinguishing between them except in the most empirical way. Category labels need to be defined with greater precision. There are also certain limitations inherent in the fact that the categories used for the qualitative analysis are not independent; a large number of responses in one category lowers the available number that can be placed in others.

It is possible that the type of response elicited may be in part a function of the conceptual demand of the stimulus word. An analysis of results indicated that 85 per cent of the use and description responses were given to the first ten words in the test, i.e., to such words as "orange," "envelope" and "straw." On the other hand, the pupils tended to give explanation responses to words which do not lend themselves to a functional response, e.g., "skill," and "priceless." Ehrmann (69) has suggested that vocabulary responses vary according to the concrete-abstract polarity of the stimulus word. Certain words, therefore, may have influenced the children in the direction of abstract or concrete responses.

The validity of the conclusions made in this study depends in part on the degree to which verbal expression can be judged as a measure of concept formation. It is also recognized that the children's awareness of meaning may exceed their ability to express it.





Werner and Kaplan (1970), in their study of the acquisition of word meanings have stated:

Though it is true that immature concrete symbolism is characteristic of our younger subjects, rarely occurring with the older children, one should not be misled by the notion that the symbolic behaviour of a particular subject is either concrete throughout a test or abstract. . . the level of operation is not a simple function of the maturational status but depends, among other things, on the task at hand (p. 117).

### III. IMPLICATIONS

The results of a study such as this may prove useful to the classroom teacher who is concerned with the child's total readiness for reading. An analysis of vocabulary responses should give some indication as to whether the child lags behind the rest of the class in conceptual development. Assessment of vocabulary responses may thus serve to throw further light on the differences which may exist in the thinking of good readers and poor readers. As well as determining whether a definition of a word given on a vocabulary test is correct or incorrect an effort may be made to differentiate the type of definition credited as correct. The patterns revealed may be of some help in the diagnosis of reading problems and the use of the vocabulary test as a diagnostic tool may be extended. The technique has had use in psychological clinics. Much of the descriptive literature is found in psychological journals. It has also been used effectively with problem readers. For example, the method of qualitative analysis has been used at the Reading and Language Center, University of Alberta, Edmonton.



It has been suggested that the relative concreteness in the thinking of poor readers may be a factor in their academic underproduction. It is generally agreed that there is need for more definite information concerning classroom practice, i.e., the amounts and types of instruction which best promote conceptual development and vocabulary development. As Russell (80) has indicated many types of curriculum organization may be considered as plans for developing deeper and broader concepts, e.g., the cyclic approach to subject matter, and the unit of work. Specific suggestions for the teaching of concepts are included in the literature on factors affecting concept development. Numerous suggestions are also available in studies on vocabulary development and in articles written for the teacher of reading such as those by McCullough (60) and Serra (84).

Experience is indicated as one of the conditions related to concept formation in the child. Stephens (86) has stated:

. . .our grasp of those concepts which go beyond our experience is very uncertain and vague. Typically we cannot go many steps beyond concrete experience if we are to understand an idea in a defensible manner (p. 43).

One way in which the school can foster concept development in the poor reader is by providing as many pertinent experiences as possible. In this regard it might be worthwhile to reassess the use of audiovisual aids with children identified as poor readers. Zil'Bershtein (112) for example, has indicated ways in which visual aids may be utilized to stimulate the students' cognitive activity. He has written:







One of the most important conditions of learning different concepts is for the students clearly to realize which are their essential and which are their non-essential features and here the medium of visual education is of the greatest importance: making it possible: (a) graphically to illustrate the essential features of a given concept and push into the background those features that have minor importance, (b) to make the essential features of various objects and processes stand out more clearly by separating them from other features, (c) to express in visual form different combinations of the same features in different objects and phenomena, (d) to show visually essentially the same features in a large number of dissimilar objects related to the same concept . . . , (e) to compare graphically, by means of different combinations, objects and phenomena having common essential but different non-essential features, or vice versa (p. 37).

There should be a direct advantage in teaching classification skills throughout the elementary grades. Similarly, the use of definition and analysis merits further examination. Watts (97) has made several suggestions which have important implications for classroom procedure. He had indicated, for example, that children may be assisted in organizing their thought around general terms of increasingly wide range, and that they may be trained in verbal description.

Finally a qualitative analysis of vocabulary may be carried out in conjunction with a study of other written and oral language responses of the poor reader. The results of such an analysis should prove fruitful in throwing further light on his concept development.

Concerning concept teaching Carroll has written (16):

What is needed eventually is a scientific "rhetoric" for the teaching of concepts - assembled not only from the traditional rhetoric of exposition but also from whatever scientific



experiments on concept teaching can tell us. We will be better off, however, if concept attainment studies begin to give attention to the manner in which real-life, non-artificial concepts can be taught most efficiently - presumably by combination of both deductive and inductive procedures (p. 183).

#### IV. SUGGESTIONS FOR FURTHER RESEARCH

In general, further research is necessary in order that techniques of classifying children's responses may be further refined. There is need for more research regarding the nature of the categories. Further refinement of the classification system would seem to be particularly fruitful. More specifically, it may be desirable to extend analysis of the vocabulary responses of good readers and poor readers in the following directions:

1. The present study was conducted with test items which had a steep gradient of difficulty. An experiment may be conducted in which test items are equated on the basis of some index of difficulty, e.g., words may be equated according to frequency of occurrence. This may be done to insure that any qualitative differences which may be found are not a function of vocabulary range.

2. In order to determine whether the quality of response is general rather than specific to a recall test an investigation may be conducted with good and poor readers using a recognition type multiple-choice vocabulary test in which the choices for each item are correct but of different conceptual levels.

3. It is suggested that the qualitative level of vocabulary





response be studied in relation to specific comprehension skills of the students in order to clarify cause and effect relationships.

4. Further studies may be conducted involving the use of analogy, classification tasks and similar activities, with a view to making qualitatively clearer the lack in the verbal responses of poor readers.

5. It is recommended that studies in a qualitative analysis of vocabulary responses be carried out in terms of the nature of the words themselves and the referents they represent.

## V. SUMMARY

The present study was designed to investigate the hypothesis that there is a significant difference in the qualitative level of vocabulary responses of good and poor readers. The experimental population for the present investigation consisted of two groups of thirty children each from grade six, matched with respect to sex, intelligence and age. One group consisted of good readers, the second of poor readers, all of whom were chosen on the basis of average reading grade score. The Stanford-Binet Vocabulary Subtest was administered and the definitions obtained from each student were classified into categories according to qualitative features. Data from the experiment were interpreted to indicate that differences in the ability to define abstractly differentiate the good reader from the poor reader.





## BIBLIOGRAPHY



## BIBLIOGRAPHY

1. Arrington, R. E. "Interrelations in the Behaviour of Younger Children," Child Development Monograph, No. 8. New York: Teachers' College, Columbia University, 1932.
2. Ausubel, David P. The Psychology of Meaningful Verbal Learning. New York: Grune and Stratton, 1963.
3. Balkan, E. R. "Psychological Researches in Schizophrenic Language and Thought," Journal of Psychology, XVI (1943) 153-176.
4. Baranyai, E. H. "Verbal Comprehension in Hungarian Children of 8-10 Years," British Journal of Educational Psychology, XXVIII (1958), 262-265.
5. Barnes, E. "A Study in Children's Interests." In H. Werner and E. Kaplan, The Acquisition of Word Meanings: A Developmental Study. Evanston, Illinois: Child Development Publications, 1952.
6. Binet, A. and T. Simon. The Development of Intelligence in Children. Publication of the Training School at Vineland, New Jersey, 1916.
7. Bond, Guy L. and L. C. Fay. "A Comparison of the Performance of Good and Poor Readers on the Individual Items of the Stanford-Binet Scale, Forms L and M," Journal of Educational Research, XLIII (1950), 475-479.
8. Braun, Jean. "Relation Between Concept Formation Ability and Reading Achievement at Three Developmental Levels," Child Development, XXXIV (1963), 675-682.
9. Bruner, Jerome S., and Rose Olver. "Development of Equivalence Transformations in Children," Readings in the Psychology of Cognition. Edited by Richard C. Anderson and David P. Ausubel. Toronto: Holt, Rinehart and Winston, Inc., 1965.
10. \_\_\_\_\_, Jacqueline Goodnow, and George A. Austin. A Study of Thinking. New York: Science Editions, Inc., 1962.
11. Buhler, Karl. The Mental Development of the Child. The Evolution of Thinking. London: Kegan Paul, Trench and Trubner, 1930.





12. Burks, Harold F., and Paul Bruce. "The Characteristics of Poor and Good Readers as Disclosed by the Wechsler Intelligence Scale for Children," Journal of Educational Psychology, XLVI (December, 1955), 488-493.
13. Burns, D. C. "A Note on the Responses Made by Secondary School Children in Their Definitions of Words," British Journal of Educational Psychology, XXX (1960), 30-39.
14. Burt, C. Mental and Scholastic Tests. Second edition. London: Staples, 1947.
15. Cantor, Alma. "An Historical, Philosophical, and Scientific Study of Kindergarten Excursions as a Basis for Social Adaptation and Reading Readiness." Master's thesis, Teachers College, The University of Cincinnati, Cincinnati, Ohio, 1935.
16. Carroll, John B. "Words, Meanings and Concepts," Harvard Educational Review, XXXIV (Spring, 1964), 178-202.
17. Chambers, W. G. "How Words Get Meaning," Pedagogical Seminary, XI (1904), 30-50.
18. Chase, C. I. "Application of Level of Concept Formation to Measurement of Vocabulary," Journal of Educational Research, LV (October, 1961), 75-78.
19. Curti, Margaret W. "Child Development-X. Concepts," Encyclopedia of Educational Research. Edited by W. S. Monroe. New York: The Macmillan Co., 1941.
20. \_\_\_\_\_. "Child Development-X. Concepts," Encyclopedia of Educational Research. Revised edition. Edited by W. S. Monroe. New York: The Macmillan Co., 1950.
21. Dawson, Mildred A., and Henry A. Bamman. Fundamentals of Reading Instruction. New York: Longmans, Green and Company, Inc., 1959.
22. Dechant, Emerald V. Improving the Teaching of Reading. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1964.
23. Dolch, E. W. Reading and Word Meaning. Boston: Ginn, 1927.
24. Feifel, Herman. "An Analysis of the Word Definition Errors of Children," The Journal of Psychology, XXXIII (1952), 65-77.



25. \_\_\_\_\_. "Qualitative Differences in the Vocabulary Responses of Normals and Abnormals," Genetic Psychology Monograph, XXXIX (1949), 151-204.
26. \_\_\_\_\_, and Irving Lorge. "Qualitative Differences in the Vocabulary Responses of Children," Journal of Educational Psychology, LXI (January, 1950), 1-18.
27. Ferguson, George A. Statistical Analysis in Psychology and Education. New York: McGraw-Hill Book Company, Inc., 1959.
28. Flavell, J. H. The Developmental Psychology of Jean Piaget. Toronto: D. Van Nostrand Company (Canada), Ltd., 1963.
29. Gates, A. I. Manual for the Gates Reading Survey. Revised edition. Bureau of Publications, Teachers College, Columbia University, 1960.
30. Gerstein, Reva A. "A Suggested Method for Analyzing and Extending the Use of Bellevue-Wechsler Vocabulary Response," Journal of Consulting Psychology, XIII (1949), 366-370.
31. Goldstein, Kurt. "The Problem of the Meaning of Words Based Upon Observation of Aphasic Patients," Journal of Psychology, II (1936), 301-316.
32. \_\_\_\_\_, and Martin Scheerer. "Abstract and Concrete Behavior: An Experiment With Special Tests," Psychological Monographs, Volume 53, No. 2, Whole No. 239, 1941.
33. Gray, W. S., and E. Holmes. The Development of Meaning Vocabularies in Reading. Publications of the Laboratory Schools of the University of Chicago, No. 6, 1938.
34. Green, H. J. "A Qualitative Method for Scoring the Vocabulary Test of the New Revision of the Stanford-Binet." Unpublished Master's thesis, Stanford University, 1931.
35. Hall, G. S. "The Contents of Children's Minds on Entering School," Pedagogical Seminary, I (1891), 139-173.
36. Hazlitt, V. "Children's Thinking," British Journal of Psychology, XX (1930), 354-361.
37. Heidbreder, Edna. "The Attainment of Concepts: III, The Process," Journal of Psychology, XXIV (1947), 93-138.





38. Horn, Ernest. Methods of Instruction in the Social Studies. New York: Charles Scribner's and Sons, 1937.
39. Huang, I. "Children's Conception of Physical Causality: A Critical Summary," Journal of Genetic Psychology, LXIII (1943), 71-121.
40. Humphrey, G. Thinking: An Introduction to Its Experimental Psychology. New York: Wiley, 1951.
41. Inhelder, Barbel. "Some Aspects of Piaget's Genetic Approach to Cognition," In William Kessen and Clementine Kuhlman, Editors, Thought in the Young Child. Monograph of the Society for Research in Child Development. Vol. XXVII, No. 2, 1962.
42. \_\_\_\_\_, and Jean Piaget. The Early Growth of Logic in the Child. Trans. E. A. Lunzer and D. Papert. London: Routledge and Kegan Paul, 1964.
43. \_\_\_\_\_. The Growth of Logical Thinking From Childhood to Adolescence. New York: Basic Books, 1958.
44. Isaacs, Susan. Intellectual Growth of Young Children. London: G. Routledge and Sons, Ltd., 1930.
45. Jan-Tausch, James. "Concrete Thinking as a Factor in Reading Comprehension." Challenge and Experiment in Reading. International Reading Association Conference Proceedings, VII (1962), 161-164.
46. Jay, Edith. "A Factor Study of Reading Tests." Unpublished Doctoral dissertation, University of Chicago, 1950 (Microfilm).
47. Jersild, A. T. Child Psychology. Third edition. New York: Prentice-Hall, 1947.
48. Johnson, Donald M. The Psychology of Thought and Judgment. New York: Harper, 1955.
49. Johnson, R. C. "Linguistic Structure as Related to Concept Formation and to Concept Content," Psychological Bulletin, LIX (1962), 468-476.
50. Kirkpatrick, E. A. "A Vocabulary Test." In W. S. Gray and Eleanor Holmes, The Development of Meaning Vocabulary in Reading. University of Chicago, 1938.





51. Kress, Roy A., Jr. "An Investigation of the Relationship Between Concept Formation and Achievement in Reading." Temple University, 1955, Dissertation Abstracts, XVI (March, 1956), 573-574.
52. Kruglov, Lorraine. "Qualitative Differences in the Vocabulary Choices of Children as Revealed in a Multiple-Choice Test," Journal of Educational Psychology, XLIV (1953), 229-243.
53. Kuder, Frederic. "Otis Self-Administering Tests of Mental Ability." The Third Mental Measurement Yearbook. Edited by Oscar Buros. New Jersey: Rutgers University Press, 1949.
54. Leeper, R. W. "Cognitive Processes." Handbook of Experimental Psychology. Edited by S. S. Stevens. New York: Wiley, 1951.
55. Levit, Martin. "On the Psychology and Philosophy of Concept Formation," Educational Theory, III (July, 1953), 275-285.
56. Lindquist, E. F. Statistical Analysis in Educational Research. Boston: Houghton Mifflin Company, 1940.
57. Martin, Harold C., and Richard M. Ohmann. The Logic and Rhetoric of Exposition. Revised edition. Toronto: Holt, Rinehart and Winston, Inc., 1963.
58. Marx, B. "A Study of the First Fifty Words of the Stanford-Binet Vocabulary." Unpublished Master's thesis, Stanford University, 1928.
59. McCarthy, Dorothea. "Language Development in Children." Manual of Child Psychology. Edited by Leonard Carmichael. New York: Wiley, 1946.
60. McCullough, Constance. "Implications of Research on Children's Concepts," The Reading Teacher, XII (December, 1959), 100-107.
61. McKee, P. "Certain Matters of Importance in the Teaching of Reading," Elementary English Review, XIV (1937), 115-116.
62. Moran, L. J., F. A. Moran, and R. R. Blake. "An Investigation of the Vocabulary Performance of Schizophrenics: II. Conceptual Levels of Definitions," Journal of Genetic Psychology, LXXX (1952), 107-132.
63. Newell, Nancy. "For Non-Readers in Distress," Elementary School Journal, XXXII (1931), 183.



64. Otis, Arthur. Otis Self-Administering Tests of Mental Ability, Manual of Directions and Key. New York: World Book Company, 1928.
65. Piaget, Jean. The Child's Conception of Physical Causality. Trans. Marjorie Gabain. Paterson, New Jersey: Littlefield, Adams and Company, 1960.
66. \_\_\_\_\_. The Language and Thought of the Child. Trans. Marjorie Gabain. New York: The World Publishing Company, 1963.
67. \_\_\_\_\_. Psychology of Intelligence. Paterson, New Jersey: Littlefield, Adams and Company, 1963.
68. Pohlmann, H. "Beitrag Zur Psychologie des Schulkindes," Padag. Monogr. Quoted in H. Werner and Bernard Kaplan, Symbol Formation. New York: John Wiley and Sons, Inc., 1963.
69. Rabin, A., G. King, and J. Ehrmann. "Vocabulary Performance of Short-Term and Long-Term Schizophrenics," Journal of Abnormal and Social Psychology, L (1955), 255-258.
70. Rapaport, David, et al. Diagnostic Psychological Testing. Volume I. Chicago: Yearbook Publishers, 1945.
71. Reed, H. B. "Meaning as a Factor in Learning," Journal of Educational Psychology, XXIX (1938), 419-430.
72. \_\_\_\_\_. Psychology of Elementary School Subjects. Revised edition. Boston: Ginn, 1938.
73. Reichard, S., M. Schneider, and D. Rapaport. "The Development of Concept Formation in Children," American Journal of Orthopsychiatry, (1944), 156-161.
74. \_\_\_\_\_, and David Rapaport. "The Role of Testing Concept Formation in Clinical Psychological Work." Bulletin Menninger Clinic, III (1943), 99-105.
75. Richman, Joseph. "The Effect of Emotional Tone Upon the Vocabulary Responses of Schizophrenics," Journal of General Psychology, LVI (1957), 95-119.
76. Ricks, James. "Age and Vocabulary Test Performance: A Qualitative Analysis of the Responses of Adults," Dissertation Abstracts, University Microfilm, Inc., Ann Arbor, Michigan, (July, 1958), 182.







77. Riess, B. F. "Genetic Changes in Semantic Conditioning," Journal of Experimental Psychology. XXXVI (1946), 143-152.
78. Robinson, Richard. Definition. London: Oxford University Press, 1962.
79. Russell, David. Children's Thinking. Boston: Ginn and Company, 1956.
80. \_\_\_\_\_. "Concepts," Chester W. Harris (Editor) Encyclopedia of Educational Research. Third edition. New York: The Macmillan Company, 1960.
81. \_\_\_\_\_. The Dimensions of Children's Meaning Vocabularies in Grades Four Through Twelve. University of California Publications In Education, Volume II, No. 5, 1954.
82. \_\_\_\_\_, and Ibrahim Q. Saadeh. "Qualitative Levels in Children's Vocabularies," Journal of Educational Psychology, LIII (August, 1962), 170-174.
83. Scheerer, Martin. "Cognitive Theory," Handbook of Social Psychology, Volume I. Edited by Gardner Linzey. Reading, Massachusetts: Addison-Wesley Publishing Company, Inc., 1954.
84. Serra, M. C. "A Study of Fourth Grade Children's Comprehension of Certain Verbal Abstractions," Journal of Experimental Education, XXII (December, 1953), 103-118.
85. \_\_\_\_\_. "How to Develop Concepts and Their Verbal Representations," Elementary School Journal, LIII (January, 1953), 275-285.
86. Smith, H. P., and E. V. Dechant. Psychology in Teaching. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1961.
87. Smith, Nila B. Reading Instruction for Today's Children. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1963.
88. Strickland, Ruth G. The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children. Bulletin of the School of Education, Indiana University, 38:4 (July, 1962). Bloomington: Indiana University, 1962.
89. Terman, L. M. The Measurement of Intelligence. Boston: Houghton Mifflin Company, 1916.



90. \_\_\_\_\_, and H. G. Childs. "A Tentative Revision and Extension of the Binet-Simon Measuring Scale of Intelligence," Journal of Educational Psychology, III (1912), 198-208.
91. \_\_\_\_\_, and M. A. Merrill. Measuring Intelligence. Boston: Houghton Mifflin Company, 1937.
92. \_\_\_\_\_. Stanford-Binet Intelligence Scale, Manual for the Third Revision Form L-M. Boston: Houghton Mifflin Company, 1960.
93. Thompson, G. G. Child Psychology, Boston: Houghton Mifflin Company, 1952.
94. Thompson, Jane. "The Ability of Children of Different Grade Levels to Generalize on Sorting Tests," The Journal of Psychology, XI (1941), 119-126.
95. Thorndike, Edward L. "Reading as Reasoning: A Study of Mistakes in Paragraph Reading," Journal of Educational Psychology, VIII (June, 1917), 323-332.
96. Thurstone, L. L., and T. G. Thurstone. "Factorial Studies of Intelligence," Psychometric Monograph. No. 2. Chicago: University of Chicago Press, 1941.
97. Vinacke, W. E. The Psychology of Thinking. Toronto: McGraw-Hill Book Company, Inc., 1952.
98. Vygotsky, L. S. Thought and Language. The Massachusetts Institute of Technology, 1962.
99. Watts, A. F. The Language and Mental Development of Children. Boston: D. C. Heath and Company, 1947.
100. Wechsler, D. The Measurement of Adult Intelligence. Third edition. Baltimore: Williams and Wilkins, 1944.
101. Welch, L. "A Preliminary Investigation of Some Aspects of the Hierarchical Development of Concepts," Journal of Genetic Psychology, XXII (1940), 175-206.
102. Welch, Livingston, and Louis Long. "The Higher Structural Phases of Concept Formation in Children," Journal of Psychology, IX (1940), 59-95.
103. \_\_\_\_\_. "A Further Investigation of the Higher Structural Phases of Concept Formation," Journal of Psychology, X (October, 1940), 211-220.





104. \_\_\_\_\_. "Methods Used by Children in Solving Inductive Reasoning Problems," Journal of Psychology, XIV (1942), 269-275.
105. Wenzel, Bernice M., and Christine Flurry. "Sequential Order of Concept Attainment," Journal of Experimental Psychology, XXXVIII (October, 1948), 547-557.
106. Werner, Heinz. Comparative Psychology of Mental Development. New York: International Universities Press, Inc., 1957.
107. \_\_\_\_\_, and Edith Kaplan. "Development of Word Meaning Through Verbal Context," Journal of Experimental Psychology, XXXVIII (October, 1948), 547-557.
108. \_\_\_\_\_, and Bernard Kaplan. Symbol Formation. New York: John Wiley and Sons, Inc., 1963.
109. Wickens, Alice R. "The Ability of Good and Poor Readers to Abstract." Unpublished Doctoral dissertation, University of Chicago, 1963.
110. Wilson, Mary C. "The Effect of Amplifying Materials Upon Comprehension," Journal of Experimental Education, XIII (September, 1944), 5-8.
111. Wolff, W. The Personality of the Preschool Child. New York: Grune and Stratton, 1946.
112. Zil'Bershtein, A. I. "The Role of Visual Aids in Stimulating Pupils' Cognitive Activity," Soviet Education, VI (November, 1963), 35-43.





## APPENDICES



APPENDIX A

EXAMPLES OF RESPONSES





## EXAMPLES OF RESPONSES AND THEIR CLASSIFICATIONS

## ORANGE

Synonym Category

Synonym unmodified	It's a fruit.
Synonym modified by use	It's a fruit that we eat.
Synonym modified by description	It's a fruit, a yellow fruit enclosed in a skin. It's kind of juicy.
Synonym modified by use and description	It's a fruit the color orange. We eat it.

Use, Description, and Use and Description Category

Use	Something to eat.
Description	An orange is round with juice, and it's orange in the juicy inside.
Use and description	It's a yellow sphere that you eat and it's got a peel.

## ENVELOPE

Synonym Category

Synonym modified by use	It's a container that you put a letter in.
Synonym modified by use and description	An envelope is a little sort of package made out of paper that you put letters in.

Use, Description, and Use and Description Category

Use	An envelope is to put letters in to mail. You put a letter inside of it.
Use and description	Envelope is made out of paper and you put letters in it.



Demonstration, Repetition, Illustration and Inferior Explanation Category

Inferior explanation                      It's like a small bag.

STRAW

Synonym Category

Synonym modified                      Dry grass, or hay.

Synonym modified by use and description                      A small tube, paper tube or plastic that is used for a - taking a liquid from a cup or bottle to the mouth.

Use, Description, and Use and Description Category

Use                      A straw is to drink juice from. It makes hats.

Description                      It's long, round, and it's paper.

Use and description                      Cows usually eat straw or it's sort of long and sort of like grass.

Explanation Category

Explanation                      Well like the wheat when it comes out of the combine, the straw, what's just left behind is the straw.

PUDDLE

Synonym Category

Synonym modified by description                      A little pool of water

Use, Description, and Use and Description Category

Use                      Puddle is to walk in.

Description                      It's made out of rain. It could be large or small and it's either got water, muddy water, something like that, or a liquid.



Explanation Category

Explanation

After it rains water gathers in low parts of the ground.

Demonstration, Repetition, Illustration and Inferior Explanation Category

Repetition

A puddle of water

TAP

Synonym Category

Synonym unmodified

A faucet. To knock.

Synonym modified by use

A faucet where you turn water on and off.

Synonym modified by description

A small noise made with either your foot or your hand or something.

Synonym qualified as to degree

To hit something lightly.

Use, Description, and Use and Description Category

Use

You put on water on a tap; the water comes out of the tap. Tap is to get a drink with a glass.

Description

A place where water comes out.

Use and Description

It's a silver thing with holes in it that water comes out.

Demonstration, Repetition, Illustration and Inferior Explanation Category

Repetition

Well you could tap on the wall or the door.

Illustration

When you do it with your shoe.

Error Category

Wrong definition

It means to strike something quite hard.





GOWN

Synonym Category

Synonym unmodified	A dress. A robe.
Synonym modified by use	A dress that women wear to formal dances.
Synonym modified by description	A gown is a long evening dress.
Synonym modified by use and description	A gown is usually a long dress for formals.

Use, Description, and Use and Description Category

Use	Gown is to wear out.
Description	It's long. It goes down to the floor and it's fancy.
Use and description	People wear gowns and it's made out of cloth.

Demonstration, Repetition, Illustration and Inferior Explanation Category

Illustration	You could have a gown for a wedding dress.
Inferior explanation	Good clothes.

ROAR

Synonym Category

Synonym unmodified	A noise.
Synonym modified by description	A loud forceful noise. A noise made by a lion or any other large animal.
Synonym qualified as to degree	To growl very loud. Make a noise loudly.

Explanation Category

Explanation	Roar is when a child or anybody will just yell out; like a lion, he roars.
-------------	--



Demonstration, Repetition, Illustration and Inferior Explanation Category

Illustration

A lion when it makes a noise.

## EYELASH

(The child was asked to point if it was not clear from his response that he had differentiated eyelash from eyelid or eyebrow.)

Synonym Category

Synonym modified by use

Hairs that protect your eye from getting dust in it.

Synonym modified by description

Hair that is on your eyelid.

Synonym modified by use and description

A piece of hair which is on your eyelid to cover - to clean - to prevent the dirt from getting in your eyes.

Use, Description, and Use and Description Category

Use

Eyelash is to help from the dust getting in your eye.

Description

It's on our eyes; it's on our eyelids.

Use and description

It's above your eye, that protects particles from getting in the eye.

Demonstration, Repetition, Illustration and Inferior Explanation Category

Demonstration

Right here. (Pointed to eyelashes)

Error Category

Incorrect demonstration

(Pointed to eyebrow)

## MARS

Synonym Category

Synonym unmodified

It's a planet. A scratch.





Synonym modified by description	A planet which is reddish in colour. It is fourth from the sun. The fourth planet in the solar system.
---------------------------------	---

Use, Description, and Use and Description Category

Description	Up in the sky.
-------------	----------------

JUGGLER

Synonym Category

Synonym unmodified	Performer
Synonym modified by description	A man who throws up things in the air in a circle.

Explanation Category

Explanation	Well, you have about three articles, which one is always in the air that you do not have and you toss them around in a circle.
-------------	--

Demonstration, Repetition, Illustration and Inferior Explanation Category

Repetition	He juggles balls or something like that.
------------	--

Error Category

Wrong Definition	A man you plays a kind of music with a jug.
------------------	---

SCORCH

Synonym Category

Synonym unmodified	To burn.
Synonym qualified as to degree	To burn a little.

Use, Description, and Use and Description Category

Description	Scorch is ...well, it's burnt sort of.
-------------	--



Explanation Category

## Explanation

Scorch is when something is burnt very lightly, not enough to really start a fire. When you scorch your hair or scorch yourself, you don't really burn yourself badly but you hurt yourself lightly.

Demonstration, Repetition, Illustration and Inferior Explanation Category

## Illustration

If you burn the bottom of a pot you scorch it.

## Inferior explanation

To make a thing real hot. Very hot.

Error Category

## Wrong definition

When you bruise something you scorch it.

## Clang association

It's a scratch made by a dog or a cat. To scold.

## LECTURE

Synonym Category

## Synonym unmodified

To give a talk. A speech. A talking to.

## Synonym modified by description

To talk on one subject given by a specialist.

Use, Description, and Use and Description Category

## Description

It's like a report

Explanation Category

## Explanation

Lecture is when a person gets up and tells about a subject.

Demonstration, Repetition, Illustration and Inferior Explanation Category

## Illustration

You can get a lecture in school in good behavior.

## Inferior explanation

Tell something to people.



Error Category

Wrong definition	Something like a test to see how good you are.
------------------	--

SKILL

Synonym Category

Synonym unmodified	Ability. Talent.
Synonym qualified as to degree	Ability to do something well.

Explanation Category

Explanation	It's what you're good at like if you're good at carpeting, then you do it as a skill. You have a special knack for doing something. You're able to do it.
-------------	---

Demonstration, Repetition, Illustration and Inferior Explanation Category

Illustration	Writing is a skill. Skill is to be very good in a sport or in school.
--------------	---

Error Category

Wrong definition	You test something to see if you know anything.
------------------	---

BRUNETTE

Synonym Category

Synonym modified by description	A color of a girl's hair; brownish.
---------------------------------	-------------------------------------

Explanation Category

Explanation	Well, your hair is brown.
-------------	---------------------------

Error Category

Wrong definition	I think it's red hair, red hair.
------------------	----------------------------------





MUZZLE

Synonym Category

Synonym unmodified	Cover the mouth. A dog's nose.
Synonym modified by use	Covering over the dog's mouth to stop him from biting.

Use, Description, and Use and Description Category

Use	You put it on a dog so he won't bite or yelp.
Use and description	It's to keep some animal's mouth closed. It's probably made of wire or leather or something.

Error Category

Misinterpretation	Something in your body that ...(muscle) When you talk, not clearly ...(muffle)
Wrong definition	A dog has a muzzle on him; it's hair.
Clang association	Muzzle is when you muddle, like.

HASTE

Synonym unmodified	Hurry. Fast.
Synonym modified by description	Very fast.

Explanation Category

Explanation	If you're in a hurry you have to make haste.
-------------	--

Error Category

Misinterpretation	You don't like anybody. (hate)
Wrong definition	Don't do it too quickly. Greedy.
Clang association	Hesitate. To waste time. You hate something.



PECULIARITY

Synonym Category

Synonym unmodified	Something unusual. Rare. Not ordinary. Something odd.
--------------------	--

Explanation Category

Explanation	There's something queer about it. It's when something is different to you.
-------------	---

Demonstration, Repetition, Illustration and Inferior Explanation Category

Repetition	It's pretty peculiar.
Inferior explanation	It's different things, like, different things.

Error Category

Wrong definition	A resemblance.
------------------	----------------

PRICELESS

Synonym Category

Synonym unmodified	Valuable.
Synonym modified by description	Very valuable. Very precious.

Explanation Category

Explanation	You can't put a price on it, it's so valuable. Money can't buy it as it's worth too much.
-------------	---

Demonstration, Repetition, Illustration and Inferior Explanation Category

Inferior explanation	Worth something.
----------------------	------------------

Error Category

Wrong definition	Priceless is something that isn't worth anything. Cheap. Doesn't have value.
------------------	--





## REGARD

Synonym Category

Synonym unmodified

Refer to.

Explanation Category

Explanation

It's when you think of someone with respect.

Error Category

Misinterpretation

To protect.

Wrong definition

Besides or anyhow. Put it aside.

Clang association

To guard.

Repetition without explanation

Regard to the happening.

## TOLERATE

Synonym Category

Synonym unmodified

To stand. To put up with. To accept.

Explanation Category

Explanation

You can put up with something.

Demonstration, Repetition, Illustration and Inferior Explanation Category

Inferior explanation

You can't stand it.

Error Category

Wrong definition

To scold somebody. To work. To keep pestering a person.

Clang association

You're tall.



DISPROPORTIONATE

Synonym Category

Synonym unmodified	Not in proportion. Out of shape.
--------------------	----------------------------------

Explanation Category

Explanation	Out of joint or something; it's not in shape.
-------------	---

Error Category

Wrong definition	Not to move. Of quantity. Not very much quantity.
------------------	---

LOTUS

Synonym Category

Synonym unmodified	A flower. A kind of plant.
Synonym modified by description	It's a type of Chinese flower.

Error Category

Misinterpretation	It's some kind of insect. It's something that gets on a plant. A bug.
Clang association	Notice. Locust.

SHREWD

Synonym Category

Synonym unmodified	Sly. Smart.
Synonym modified by description	Very sly.

Explanation Category

Explanation	A person uses some sort of tricks; he's a very sly person. A person has much guile.
-------------	---



Error Category

Misinterpretation	Sort of mean. It's sort of your personality; you're mean.
Wrong definition	It's very fast.
Clang association	You're rude. A shrewd haircut.

MOSAIC

Synonym Category

Synonym modified by description	A type of art that you glue small pieces together and shape a picture. Work in stones that makes a design in walls or tables.
---------------------------------	---

Use, Description, and Use and Description Category

Description	All sorts of little pieces, like, in a picture.
-------------	---

Explanation Category

Explanation	There are little squares and triangles and rectangles that you put together to make a picture.
-------------	--

Error Category

Wrong definition	Kind of clothing. The art of weaving on carpets and things.
------------------	---

STAVE

Synonym Category

Synonym unmodified	A stick.
Synonym modified by description	A pole used by Scouts as a walking stick. A stock that shepherds use.

Error Category

Wrong definition	It's an instrument for cutting.
------------------	---------------------------------





APPENDIX B

VOCABULARY SUBTEST



## VOCABULARY SUBTEST OF THE STANFORD-BINET

## INTELLIGENCE SCALE, FORM L-M

1. orange	16. haste	31. frustrate
2. envelope	17. peculiarity	32. flaunt
3. straw	18. priceless	33. incrustation
4. puddle	19. regard	34. retroactive
5. tap	20. tolerate	35. philanthropy
6. gown	21. disproportionate	36. piscatorial
7. roar	22. lotus	37. milksop
8. eyelash	23. shrewd	38. harpy
9. Mars	24. mosaic	39. depredation
10. juggler	25. stave	40. perfunctory
11. scorch	26. bewail	41. achromatic
12. lecture	27. ochre	42. casuistry
13. skill	28. repose	43. homunculus
14. brunette	29. ambergris	44. sudorific
15. muzzle	30. limpet	45. parterre





## APPENDIX C

## MENTAL ABILITY TEST



OTIS SELF-ADMINISTERING TESTS OF MENTAL ABILITY

By ARTHUR S. OTIS, PH.D.

Formerly Development Specialist with Advisory Board, General Staff, United States War Department

INTERMEDIATE EXAMINATION: FORM A  
For Grades 4-9

20 Score.....

Read this page. Do what it tells you to do.

Do not open this paper, or turn it over, until you are told to do so. Fill these blanks, giving your name, age, birthday, etc. Write plainly.

Name.....Age last birthday.....years  
First name, initial, and last name  
Birthday.....Teacher.....Date..... 19....  
Month Day  
Grade.....School.....City.....

This is a test to see how well you can think. It contains questions of different kinds. Here is a sample question already answered correctly. Notice how the question is answered :

Sample: Which one of the five words below tells what an apple is?  
1 flower, 2 tree, 3 vegetable, 4 fruit, 5 animal..... ( 4 )

The right answer, of course, is "fruit" ; so the word "fruit" is underlined. And the word "fruit" is No. 4 ; so a figure 4 is placed in the parentheses at the end of the dotted line. This is the way you are to answer the questions.

Try this sample question yourself. Do not write the answer ; just draw a line under it and then put its number in the parentheses :

Sample: Which one of the five things below is round?  
1 a book, 2 a brick, 3 a ball, 4 a house, 5 a box.....( )

The answer, of course, is "a ball" ; so you should have drawn a line under the words "a ball" and put a figure 3 in the parentheses. Try this one :

Sample: A foot is to a man and a paw is to a cat the same as a hoof is to a — what?  
1 dog, 2 horse, 3 shoe, 4 blacksmith, 5 saddle.....( )

The answer, of course, is "horse" ; so you should have drawn a line under the word "horse" and put a figure 2 in the parentheses. Try this one :

Sample: At four cents each, how many cents will 6 pencils cost?.....( )

The answer, of course, is 24, and there is nothing to underline ; so just put the 24 in the parentheses. If the answer to any question is a number or a letter, put the number or letter in the parentheses without underlining anything. Make all letters like printed capitals.

The test contains 75 questions. You are not expected to be able to answer all of them, but do the best you can. You will be allowed half an hour after the examiner tells you to begin. Try to get as many right as possible. Be careful not to go so fast that you make mistakes. Do not spend too much time on any one question. No questions about the test will be answered by the examiner after the test begins. Lay your pencil down.

Do not turn this page until you are told to begin.

## EXAMINATION BEGINS HERE.

1. Which one of the five things below does not belong with the others? (Do not write on these dotted lines.)  
1 potato, 2 turnip, 3 carrot, 4 stone, 5 onion..... ( )
2. Which one of the five words below tells best what a saw is?  
1 something, 2 tool, 3 furniture, 4 wood, 5 machine..... ( )
3. Which one of the five words below means the opposite of west?  
1 north, 2 south, 3 east, 4 equator, 5 sunset..... ( )
4. A hat is to a head and a glove is to a hand the same as a shoe is to what?  
1 leather, 2 a foot, 3 a shoestring, 4 walk, 5 a toe..... ( )
5. A child who knows he is guilty of doing wrong should feel (?)  
1 bad, 2 sick, 3 better, 4 afraid, 5 ashamed..... ( )
6. Which one of the five things below is the smallest?  
1 twig, 2 limb, 3 bud, 4 tree, 5 branch..... ( )
7. Which one of the five things below is most like these three: cup, plate, saucer?  
1 fork, 2 table, 3 eat, 4 bowl, 5 spoon..... ( )
8. Which of the five words below means the opposite of strong?  
1 man, 2 weak, 3 small, 4 short, 5 thin..... ( )
9. A finger is to a hand the same as a toe is to what?  
1 foot, 2 toenail, 3 heel, 4 shoe, 5 knee..... ( )
10. Which word means the opposite of sorrow?  
1 sickness, 2 health, 3 good, 4 joy, 5 pride..... ( )
11. Which one of the ten numbers below is the smallest? (Tell by letter.)  
A 6084, B 5160, C 4342, D 6521, E 9703, F 4296, G 7475, H 2657, J 8839, K 3918 ( )
12. Which word means the opposite of pretty?  
1 good, 2 ugly, 3 bad, 4 crooked, 5 nice..... ( )
13. Do what this mixed-up sentence tells you to do.  
number Write the the in 5 parentheses..... ( )
14. If we believe some one has committed a crime, but we are not sure, we have a (?)  
1 fear, 2 suspicion, 3 wonder, 4 confidence, 5 doubtful..... ( )
15. A book is to an author as a statue is to (?)  
1 sculptor, 2 marble, 3 model, 4 magazine, 5 man..... ( )
16. Which is the most important reason that words in the dictionary are arranged alphabetically?  
1 That is the easiest way to arrange them. 2 It puts the shortest words first. 3 It enables us to find any word quickly. 4 It is merely a custom. 5 It makes the printing easier .. ( )
17. Which one of the five things below is most like these three: plum, apricot, apple?  
1 tree, 2 seed, 3 peach, 4 juice, 5 ripe..... ( )
18. At 4 cents each, how many pencils can be bought for 36 cents?..... ( )
19. If a person walking in a quiet place suddenly hears a loud sound, he is likely to be (?)  
1 stopped, 2 struck, 3 startled, 4 made deaf, 5 angered..... ( )
20. A boy is to a man as a (?) is to a sheep.  
1 wool, 2 lamb, 3 goat, 4 shepherd, 5 dog..... ( )
21. One number is wrong in the following series. What should that number be? (Just write the correct number in the parentheses.)  
1 6 2 6 3 6 4 6 5 6 7 6..... ( )
22. Which of the five things below is most like these three: horse, pigeon, cricket?  
1 stall, 2 saddle, 3 eat, 4 goat, 5 chirp..... ( )
23. If the words below were rearranged to make a good sentence, with what letter would the last word of the sentence begin? (Make the letter like a printed capital.)  
nuts from squirrels trees the gather..... ( )
24. A man who betrays his country is called a (?)  
1 thief, 2 traitor, 3 enemy, 4 coward, 5 slacker..... ( )
25. Food is to the body as (?) is to an engine.  
1 wheels, 2 fuel, 3 smoke, 4 motion, 5 fire..... ( )
26. Which tells best just what a pitcher is?  
1 a vessel from which to pour liquid, 2 something to hold milk, 3 It has a handle, 4 It goes on the table, 5 It is easily broken..... ( )

*Do not stop. Go on with the next page.*



27. If George is older than Frank, and Frank is older than James, then George is (?) James.  
1 older than, 2 younger than, 3 just as old as, 4 (cannot say which)..... ( )
28. Count each 7 below that has a 5 next after it. Tell how many 7's you count.  
7 5 3 0 9 7 3 7 8 5 7 4 2 1 7 5 7 3 2 4 7 0 9 3 7 5 5 7 2 3 5 7 7 5 4 7..... ( )
29. If the words below were rearranged to make a good sentence, with what letter would the last word of the sentence begin? (Make the letter like a printed capital.)  
leather shoes usually made are of..... ( )
30. An electric light is to a candle as a motorcycle is to (?)  
1 bicycle, 2 automobile, 3 wheels, 4 speed, 5 police..... ( )
31. Which one of the words below would come first in the dictionary?  
1 march, 2 ocean, 3 horse, 4 paint, 5 elbow, 6 night, 7 flown..... ( )
32. The daughter of my mother's brother is my (?)  
1 sister, 2 niece, 3 cousin, 4 aunt, 5 granddaughter..... ( )
33. One number is wrong in the following series. What should that number be?  
3 4 5 4 3 4 5 4 3 5..... ( )
34. Which of the five things below is most like these three: boat, horse, train?  
1 sail, 2 row, 3 motorcycle, 4 move, 5 track..... ( )
35. If Paul is taller than Herbert and Paul is shorter than Robert, then Robert is (?) Herbert.  
1 taller than, 2 shorter than, 3 just as tall as, 4 (cannot say which)..... ( )
36. What is the most important reason that we use clocks?  
1 to wake us up in the morning, 2 to regulate our daily lives, 3 to help us catch trains,  
4 so that children will get to school on time, 5 They are ornamental..... ( )
37. A coin made by an individual and meant to look like one made by the government is called(?)  
1 duplicate, 2 counterfeit, 3 imitation, 4 forgery, 5 libel..... ( )
38. A wire is to electricity as (?) is to gas.  
1 a flame, 2 a spark, 3 hot, 4 a pipe, 5 a stove..... ( )
39. If the following words were arranged in order, with what letter would the middle word begin?  
Yard Inch Mile Foot Rod..... ( )
40. One number is wrong in the following series. What should that number be?  
5 10 15 20 25 29 35 40 45 50..... ( )
41. Which word means the opposite of truth?  
1 cheat, 2 rob, 3 liar, 4 ignorance, 5 falsehood..... ( )
42. Order is to confusion as (?) is to war.  
1 guns, 2 peace, 3 powder, 4 thunder, 5 army..... ( )
43. In a foreign language, good food = Bano Naab  
good water = Heto Naab  
The word that means *good* begins with what letter?..... ( )
44. The feeling of a man for his children is usually (?)  
1 affection, 2 contempt, 3 joy, 4 pity, 5 reverence..... ( )
45. Which of the five things below is most like these three: stocking, flag, sail?  
1 shoe, 2 ship, 3 staff, 4 towel, 5 wash..... ( )
46. A book is to information as (?) is to money.  
1 paper, 2 dollars, 3 bank, 4 work, 5 gold..... ( )
47. If Harry is taller than William, and William is just as tall as Charles, then Charles is (?) Harry.  
1 taller than, 2 shorter than, 3 just as tall as, 4 (cannot say which)..... ( )
48. If the following words were arranged in order, with what letter would the middle word begin?  
Six Ten Two Eight Four..... ( )
49. If the words below were rearranged to make a good sentence, with what letter would the third word of the sentence begin? (Make the letter like a printed capital.)  
men high the a wall built stone..... ( )
50. If the suffering of another makes us suffer also, we feel (?)  
1 worse, 2 harmony, 3 sympathy, 4 love, 5 repelled..... ( )
51. In a foreign language, grass = Moki  
green grass = Moki Laap  
The word that means *green* begins with what letter?..... ( )

*Do not stop. Go on with the next page.*



52. If a man has walked west from his home 9 blocks and then walked east 4 blocks, how many blocks is he from his home?..... ( )
53. A pitcher is to milk as (?) is to flowers.  
1 stem, 2 leaves, 3 water, 4 vase, 5 roots..... ( )
54. Do what this mixed-up sentence tells you to do.  
sum three Write two the four and of..... ( )
55. There is a saying, "Don't count your chickens before they are hatched." This means (?)  
1 Don't hurry. 2 Don't be too sure of the future. 3 Haste makes waste. 4 Don't gamble ..... ( )
56. Which statement tells best just what a fork is?  
1 a thing to carry food to the mouth, 2 It goes with a knife, 3 an instrument with prongs at the end, 4 It goes on the table, 5 It is made of silver..... ( )
57. Wood is to a table as (?) is to a knife.  
1 cutting, 2 chair, 3 fork, 4 steel, 5 handle..... ( )
58. Do what this mixed-up sentence tells you to do.  
sentence the letter Write last this in..... ( )
59. Which one of the words below would come last in the dictionary?  
1 alike, 2 admit, 3 amount, 4 across, 5 after, 6 amuse, 7 adult, 8 affect ( )
60. There is a saying, "He that scatters thorns, let him go barefoot." This means (?)  
1 Let him who causes others discomforts bear them himself also. 2 Going barefoot toughens the feet. 3 People should pick up what they scatter. 4 Don't scatter things around. .... ( )
61. If the following words were arranged in order, with what letter would the middle word begin?  
Plaster Frame Wallpaper Lath Foundation..... ( )
62. In a foreign language,  
many boys = Boka Hepo  
many girls = Marti Hepo  
many boys and girls = Boka Ello Marti Hepo  
The word that means *and* begins with what letter?..... ( )
63. A statement which expresses just the opposite of that which another statement expresses is said to be a (?)  
1 lie, 2 contradiction, 3 falsehood, 4 correction, 5 explanation..... ( )
64. There is a saying, "Don't look a gift horse in the mouth." This means (?)  
1 It is not safe to look into the mouth of a horse. 2 Although you question the value of a gift, accept it graciously. 3 Don't accept a horse as a gift. 4 You cannot judge the age of a gift horse by his teeth..... ( )
65. Which one of the words below would come last in the dictionary?  
1 hedge, 2 glory, 3 label, 4 green, 5 linen, 6 knife, 7 honor..... ( )
66. Which statement tells best just what a watch is?  
1 It ticks, 2 something to tell time, 3 a small, round object with a chain, 4 a vest-pocket-sized time-keeping instrument, 5 something with a face and hands..... ( )
67. Ice is to water as water is to what?  
1 land, 2 steam, 3 cold, 4 river, 5 thirst..... ( )
68. Which statement tells best just what a window is?  
1 something to see through, 2 a glass door, 3 a frame with a glass in it, 4 a glass opening in the wall of a house, 5 a piece of glass surrounded by wood. .... ( )
69. Which of the five words below is most like these three: large, red, good?  
1 heavy, 2 size, 3 color, 4 apple, 5 very..... ( )
70. Write the letter that follows the letter that comes next after M in the alphabet ..... ( )
71. One number is wrong in the following series. What should that number be?  
1 2 4 8 16 24 64 ..... ( )
72. An uncle is to an aunt as a son is to a (?)  
1 brother, 2 daughter, 3 sister, 4 father, 5 girl..... ( )
73. If I have a large box with 3 small boxes in it and 4 very small boxes in each of the small boxes, how many boxes are there in all?..... ( )
74. One number is wrong in the following series. What should that number be?  
1 2 4 5 7 8 10 11 12 14..... ( )
75. There is a saying, "Don't ride a free horse to death." This means (?)  
1 Don't be cruel. 2 Don't abuse a privilege. 3 Don't accept gifts. 4 Don't be reckless. ( )

*If you finish before the time is up, go back and make sure that every answer is right.*

APPENDIX D

READING TEST





# GATES READING SURVEY—FORM 2

For Grade 3 (Second Half) Through Grade 10

Speed and Accuracy, Reading Vocabulary, Level of Comprehension



BUREAU OF PUBLICATIONS • TEACHERS COLLEGE • COLUMBIA UNIVERSITY  
525 West 120th Street, New York 27, N. Y. Copyright, 1958, by Arthur I. Gates

Write your name here.....

How old are you?.....When is your birthday?.....

School.....Grade.....Date.....

In this booklet you will find several tests of reading. They will show how fast you read, how well you understand what you read, and how many words you

know. Don't waste any time, and don't look at anyone's paper. Follow your teacher's directions. The directions for the first test are given below.

## SPEED AND ACCURACY TEST

**Directions:** Read these paragraphs. Draw a line under the word which best answers the question or completes

the sentence. Draw a line under **one** word only. Do the exercises as rapidly as you can without making errors.

**Sample:** All night long the truck driver sat at the wheel of the huge trailer truck. He drove along the twisting highways until dawn. How did he feel then?

rested

amused

tired

fresh

On the next two pages are more paragraphs similar to this sample. When your teacher tells you to turn the page, read the paragraphs and draw a line

under the word which best answers the question or completes the sentence. Be sure to do the paragraphs in order 1, 2, 3, etc., in which they are numbered.

**Do not turn the page until you are told to begin.**

**To the teacher:** Show the children the sample exercise above. Read the directions with the pupils and make sure that they know what to do. Follow this same procedure when you come to the sample exercises on pages 4 and 6.

**IMPORTANT:** Be sure to signal **STOP** at the end of the stipulated time for the Speed and Accuracy Test (6 minutes for grades 3, 4, and 5; 4 minutes for grades 6 and up). No exact time allowances are set for the other two tests. Keep your pupils working vigorously, but give them as much time as you think they need. Twenty minutes, or a little more, is usually sufficient for each test. Detailed instructions for administering and scoring the entire test are given in the Manual (included in each test package).

Speed:	Raw score.....	Grade score.....	Age score.....	Reading accuracy:
Vocabulary:	Raw score.....	Grade score.....	Age score.....	Per cent correct.....
Comprehension:	Raw score.....	Grade score.....	Age score.....	Accuracy rating.....
Averages:	Grade score.....	Age score.....		

# SPEED AND ACCURACY TEST

(Time allowance: 6 minutes for grades 3, 4, 5; 4 minutes for grade 6 and above.)

1. Betty and Sally put on their best dresses and their new shoes. They wrapped their gifts carefully in colored paper. They were going to a

fire          movie          party          playground

2. Billy sat on the window sill. Outside, the wind was blowing the snow into whirling clouds. Billy felt warm and comfortable as he watched through the

book          window          mirror          tunnel

3. Elsie and Ed sat down at a table. The waiter came over to them with a menu and asked them what they would like to eat. Where were Elsie and Ed?

restaurant          classroom          hut          movie

4. Jim walked out to the end of the pier. He fixed the line on his rod and put the bait on the hook. He threw the end of the line into the water to catch a

bird          line          fish          deer

5. In Canada, some of the people speak French, some speak English, and some speak both. How many languages are spoken in Canada?

three          two          one          four

6. Coconuts grow at the top of tall trees. Skillful climbers go up the slim trunks and throw down the fruit. What do you have to do to pick coconuts?

bend          eat          climb          hop

7. Harry put on his bathing suit. He packed his lunch. He took a towel from the shelf and put his comb in his pocket. What was Harry going to do?

swim          study          ski          read

8. Jake's dog, Bonnie, won the blue ribbon at the dog show. Photographers took pictures of Jake and Bonnie for the newspaper. How did Jake feel?

sad          ashamed          lonely          proud

9. The sun stood high in the sky. Mothers were busy, for soon the children would be coming home to have their lunch. About what time of day was it?

11:30          4:30          6:00          9:00

10. Joe ate a piece of chocolate cake. Then he ate some cookies. After that he had a few candies. What sort of food did Joe like to eat?

fruit          sweets          meat          vegetables

11. The stars are bright at night, and seem quite near. Actually, they are so far away it takes their light millions of years to reach us. Stars are

far          near          dark          new

12. Plains Indians usually lived in tents and moved about often. In the Sahara Desert, people live in the same way. The people of the Sahara live in

houses          stores          huts          tents

13. Mary was sad because she was all alone on her birthday. All at once, her friends ran in, crying, "Happy birthday, Mary!" What sort of party was this?

graduation          surprise          Christmas          Halloween

14. In 1763 the English defeated the French in a war called the French and Indian War. Indians fought on both sides. Who won this war?

French          Americans          English          Canadians

15. Mary pulled and tugged at the knob. She was not able to turn it. It was a cold day to be locked outside. What was Mary trying to open?

box          bag          safe          door

16. Our language, which already has a million words, gains thousands more each year. The number of words in our language is at least

500          1,000          10,000          1,000,000

17. Horses that run on hard and rocky surfaces must wear horseshoes to prevent their hoofs from being hurt. What are horseshoes used for?

protection          beauty          style          warmth

18. When we take a photograph, we "write with light." That is what the word means. In taking photograph, it is necessary to have a camera and

paintbrush          pencil          darkness          light

GO RIGHT ON TO NEXT PAGE



# **SPEED AND ACCURACY TEST Continued**

27. Many animals live in Australia which are found where else. One of the most interesting of these is the kangaroo. Where do kangaroos live?

England      Australia      Africa      China

28. The more branches a maple tree has, the more syrup it gives. If a maple tree gave a large amount of syrup, you would guess that its branches were

small      few      weak      many

29. Clouds are made of little drops of water hanging in the air. When a cloud becomes too heavy with water, the water falls out of the cloud. Then it becomes

rain      wood      clouds      leaves

30. Without light there is no color. When a room is completely dark, colors cannot be seen. Really the colors are not there. In the dark, everything is

blue      green      colorless      pink

31. A chickadee is small and lively. It makes many short flights. It is always hopping about. It likes to hang upside down from a branch. A chickadee is a

vegetable      fish      cat      bird

32. Joe has a toothache, and it is extremely painful. He wants to get rid of the pain, and so he is going to see someone who can fix his tooth. To whom will he go?

lawyer      dentist      teacher      friend

33. Switzerland has little land and few people. The Swiss people work hard, however, and their country is clean and prosperous. Switzerland is

large      small      dirty      poor

34. The sun is a star that keeps the earth warm. Without it, people could not raise food. It keeps them from freezing. What is the sun?

planet      moon      star      earth

35. An object traveling through the air at high speeds will become hot. A way must be found to keep rocket engines cool as they go swiftly through the

scientists      airplanes      water      air

28. Crabs have hard shells. The shells will not stretch, and so the crab must keep growing new shells as it gets bigger. How many shells does a crab grow?

several      one      none      two

29. A woodpecker pecks at trees with its bill and makes a loud rapping noise. It is looking for insects to eat. Where does the woodpecker find its food?

insects      trees      bill      flowers

30. The temperature in Death Valley, California, has been as high as 134°F. Most people like the temperature to be between 60° and 80°. Death Valley is

freezing      cold      hot      high

31. Scientists now believe that sunlight and starlight are alike. They think, too, that both are made in the same way. What is starlight like?

electricity      sunlight      darkness      fire

32. The Greeks believed in a sun god, Apollo. They thought the sun moving across the sky was Apollo driving his chariot. Apollo was the sun god of the

Romans      English      Greeks      French

33. Although they no longer look alike, the rhinoceros and the horse were once close relatives. What animal was once a close relative of the horse?

dog      cat      giraffe      rhinoceros

34. Before the Indians had horses, their tepees were small because they had to carry them on their backs. After they had horses, their tepees could be

larger      smaller      lighter      brighter

35. Bill ate some salty nuts. He went to the drinking fountain. When he turned it on, no water came out. The fountain was broken. How did Bill feel?

thirsty      happy      broken      tired

36. When water freezes, it takes up more room. If there is a crack in a rock is filled with water, and the water freezes, then it is likely that the rock will

freeze      shrink      split      spill

**STOP HERE**

Record: Raw score (number correct) ..... Accuracy: Record number attempted....., then consult Manual to find accuracy score

# READING VOCABULARY TEST

**Directions:** Look at the first word in each line. Then find another word in the same line that means the same or nearly the same as the first word. Note the number of

this word and write its number in the blank space at the right. Read line A, then line B, then line C below to see the way to do it.

A. dog	1 cloud	2 bird	3 animal	4 dress	5 fish	.....	A. <u>3</u>
B. red	1 man	2 song	3 tree	4 sit	5 color	.....	B. <u>5</u>
C. little	1 big	2 small	3 pet	4 book	5 cold	.....	C. <u>2</u>

Now read each line on this and the next page and find the word that means the same or nearly the same as the

first word in each line. Write its number in the blank space. Do as many lines as you can.

1. house	1 fruit	2 bird	3 harm	4 color	5 home	.....	1. _____
2. dinner	1 buy	2 food	3 tree	4 dark	5 day	.....	2. _____
3. hot	1 fight	2 heavy	3 warm	4 sweet	5 small	.....	3. _____
4. girl	1 child	2 cold	3 glass	4 bird	5 water	.....	4. _____
5. animal	1 wood	2 color	3 place	4 horse	5 tree	.....	5. _____
6. three	1 dark	2 tree	3 stone	4 number	5 wood	.....	6. _____
7. moving	1 eating	2 seeing	3 hurt	4 reading	5 going	.....	7. _____
8. sixteen	1 money	2 place	3 quiet	4 number	5 stingy	.....	8. _____
9. skirt	1 dance	2 game	3 dress	4 paper	5 hurry	.....	9. _____
10. carry	1 take	2 eat	3 hit	4 throw	5 buy	.....	10. _____
11. howling	1 game	2 weapon	3 bird	4 simple	5 yelling	.....	11. _____
12. crow	1 group	2 lift	3 building	4 place	5 bird	.....	12. _____
13. overflow	1 catch up	2 run over	3 deceive	4 flatter	5 smell	.....	13. _____
14. daughter	1 color	2 place	3 darker	4 child	5 game	.....	14. _____
15. chocolate	1 food	2 tardy	3 crayon	4 metal	5 tool	.....	15. _____
16. slipper	1 fall down	2 toy	3 shoe	4 candy	5 bird	.....	16. _____
17. champion	1 winner	2 horse	3 lake	4 bully	5 drink	.....	17. _____
18. ordinary	1 dainty	2 common	3 cheap	4 shiny	5 deep	.....	18. _____
19. whirl	1 run	2 spin	3 hurry	4 whine	5 color	.....	19. _____
20. palace	1 king	2 beauty	3 animal	4 building	5 drink	.....	20. _____
21. moist	1 lift up	2 ship	3 animal	4 metal	5 wet	.....	21. _____
22. attack	1 assault	2 sharpen	3 polish	4 shout	5 demand	.....	22. _____
23. exhibit	1 fight	2 show	3 confuse	4 preserve	5 shout	.....	23. _____
24. recite	1 keep	2 cut up	3 report	4 rejoin	5 shine	.....	24. _____
25. villain	1 woman	2 animal	3 scoundrel	4 town	5 plant	.....	25. _____
26. merciful	1 cruel	2 pretty	3 stuffed	4 stormy	5 kindly	.....	26. _____
27. fantastic	1 pretty	2 strange	3 unfair	4 cheap	5 expensive	.....	27. _____
28. quantity	1 amount	2 can	3 drink	4 value	5 food	.....	28. _____
29. lighten	1 lengthen	2 stagger	3 attack	4 confuse	5 reduce	.....	29. _____
30. bleak	1 high	2 sunny	3 dreary	4 sour	5 hard	.....	30. _____

GO RIGHT ON TO NEXT PAGE



# **READING VOCABULARY TEST Continued**

31. vicious	1 mixed up	2 hungry	3 dripping	4 wicked	5 paint .....	31. _____
32. previous	1 wet	2 expensive	3 before	4 friendly	5 smart .....	32. _____
33. tatter	1 apron	2 book	3 smooth	4 tear	5 add up .....	33. _____
34. readily	1 smooth	2 clear	3 easily	4 slowly	5 painfully .....	34. _____
35. mirth	1 joy	2 candy	3 flower	4 anger	5 confusion .....	35. _____
36. acquire	1 crowd	2 prevent	3 sell	4 injure	5 secure .....	36. _____
37. participate	1 turn under	2 divide	3 persecute	4 join in	5 cut up .....	37. _____
38. impudent	1 unwise	2 rude	3 wasteful	4 poor	5 sickly .....	38. _____
39. valor	1 fortress	2 dough	3 courage	4 coating	5 tool .....	39. _____
40. suspend	1 hang	2 hurry	3 pretend	4 cut up	5 spring .....	40. _____
41. condense	1 divide	2 can	3 heat	4 reduce	5 criticize .....	41. _____
42. narrative	1 order	2 stairway	3 sailor	4 fisherman	5 story .....	42. _____
43. hindrance	1 falsehood	2 retreat	3 support	4 fault	5 interference .....	43. _____
44. genial	1 soft	2 friendly	3 naughty	4 burned	5 race .....	44. _____
45. persecution	1 oppression	2 cooked	3 auction	4 battle	5 fire .....	45. _____
46. segment	1 seed	2 part	3 combination	4 rudder	5 guess .....	46. _____
47. incredulous	1 unbelieving	2 fearless	3 dependable	4 sickly	5 gullible .....	47. _____
48. populace	1 publish	2 medicine	3 coat	4 people	5 statement .....	48. _____
49. vagrant	1 worm	2 tool	3 tramp	4 direction	5 soldier .....	49. _____
50. rigidity	1 coldness	2 stiffness	3 strange	4 hunger	5 availability .....	50. _____
51. opportune	1 cheap	2 expensive	3 timely	4 faulty	5 crafty .....	51. _____
52. acute	1 sharp	2 funny	3 idiotic	4 fearful	5 horrible .....	52. _____
53. adjacent	1 under	2 next to	3 double	4 fearful	5 cowardly .....	53. _____
54. innumerable	1 durable	2 lasting	3 colored	4 unknown	5 many .....	54. _____
55. myriad	1 hive	2 jewel	3 chain	4 scattered	5 many .....	55. _____
56. complacent	1 contented	2 contrary	3 pretty	4 generous	5 expensive .....	56. _____
57. contemptible	1 brilliant	2 argumentative	3 honest	4 haughty	5 disgraceful.....	57. _____
58. admonish	1 strangle	2 mix	3 punish	4 advise	5 praise .....	58. _____
59. suppress	1 print	2 stop	3 criticize	4 supply	5 make up .....	59. _____
60. circuitous	1 indirect	2 affluent	3 plentiful	4 stingy	5 amazing .....	60. _____
61. paternal	1 foreign	2 dull	3 secretive	4 fatherly	5 boastful .....	61. _____
62. obscene	1 scenic	2 foul	3 rural	4 clean	5 subtle .....	62. _____
63. pilfer	1 strain	2 invent	3 poison	4 steal	5 retreat .....	63. _____
64. bulwark	1 post	2 challenge	3 defense	4 achievement	5 gun .....	64. _____
65. fallacious	1 dangerous	2 explosive	3 fearless	4 faulty	5 fashionable .....	65. _____

**STOP HERE**

Number correct (possible 65)..... Number wrong..... Raw score (number correct minus ¼ number wrong).....

# LEVEL OF COMPREHENSION TEST

**Directions:** Read each paragraph. Note the space marked A. Note the line of words marked A. Find the word in line A that makes the best sense in space A and draw a line under it. Do the same for the

space marked B, and for C when there is a C. The sample is marked correctly. If you cannot do one of the paragraphs, do not spend too much time on it. Go on to the next item.

**Sample:** My cat is now very old. After it has had dinner it likes to find a soft, warm\_\_\_\_\_A\_\_\_\_\_and go to\_\_\_\_\_B\_\_\_\_\_.

A. glass	cold	<u>bed</u>	lake	pig
B. town	<u>sleep</u>	five	swim	pieces

1. We have a playroom in our\_\_\_\_\_A\_\_\_\_\_. It is down in the basement, so we need an electric \_\_\_\_\_B\_\_\_\_\_even on sunny days.

A. tent	house	bed	car	lake
B. storm	friend	light	ladder	engine

2. My little brother has a big box of play blocks. I help him\_\_\_\_\_A\_\_\_\_\_towers and bridges, but he likes to\_\_\_\_\_B\_\_\_\_\_them all down.

A. burn	build	sing	shoot	sleep
B. eat	cry	swim	knock	sell

3. Bob's father took him for a ride in an airplane. It rolled across the airfield and soon it was in the air. It climbed higher and higher. From high up in the \_\_\_\_\_A\_\_\_\_\_, the houses far below\_\_\_\_\_B\_\_\_\_\_tiny.

A. sky	water	airfield	pilot	ocean
B. looked	smelled	flew	walked	felt

4. Our bread is made from wheat that comes mostly from the central part of the United States. In this part of our country there are many large\_\_\_\_\_A\_\_\_\_\_with huge fields of\_\_\_\_\_B\_\_\_\_\_and other grains.

A. balloons	boats	farms	engines	river
B. wheat	apples	pears	lettuce	fish

5. Electric-eye doors are useful in such places as railway stations and stores. In these places, people are likely to be carrying\_\_\_\_\_A\_\_\_\_\_and therefore do not have their\_\_\_\_\_B\_\_\_\_\_free to open doors.

A. woes	packages	radiators	doors	trains
B. feet	nose	spirits	hands	energy

6. When Bert was eight years old, his parents gave him a pony. First he learned to ride. Then he taught the pony to\_\_\_\_\_A\_\_\_\_\_a little\_\_\_\_\_B\_\_\_\_\_.

A. push	pull	ride	laugh	fly
B. fence	sandwich	wagon	automobile	saddle

GO RIGHT ON TO NEXT PAGE



Today most homes stay in one place, and food kept in the refrigerator. Once, however, food was in the hoof and had to be followed. Hunters and their families \_\_\_\_\_ A \_\_\_\_\_ after the \_\_\_\_\_ B \_\_\_\_\_ and carried their houses with them.

. flew wished followed stroked swam  
. stores meteors refrigerator animals medicine men

Plastic is a relatively new material. It has become of major importance in a short time. Strength and flexibility are the two outstanding qualities which make it \_\_\_\_\_ A \_\_\_\_\_ for many different \_\_\_\_\_ B \_\_\_\_\_.

. attractive edited useful manageable frightful  
. schools instances grounds boys purposes

Alexander Graham Bell was a teacher of the deaf. Because of his work with people who lived in a \_\_\_\_\_ A \_\_\_\_\_ world, he became interested in the problems of sound. Our telephone is a \_\_\_\_\_ B \_\_\_\_\_ of this interest.

. noisy brilliant soundless static changeless  
. fault charge forerunner teacher result

On mountaintops, liquids boil at lower temperatures because of diminished air pressure. Spacemen must wear pressurized suits where there is little \_\_\_\_\_ A \_\_\_\_\_ in order to keep their blood from \_\_\_\_\_ B \_\_\_\_\_.

. water food soda air liquid  
. disappearing boiling fading leaping stuffing

11. A new problem confronts the landscape gardener. He must consider his art as seen from the air. With \_\_\_\_\_ A \_\_\_\_\_ travel steadily increasing, a community must give more and more attention to its appearance from the \_\_\_\_\_ B \_\_\_\_\_.

A. automobile underground sea train airplane  
B. clouds highway ocean tunnel station

12. Iron ore is first melted into pig iron. From this pig iron all other types of iron and steel are made. As pig iron is hard and brittle, it can be used only for \_\_\_\_\_ A \_\_\_\_\_ articles that do not receive much \_\_\_\_\_ B \_\_\_\_\_. It breaks easily.

A. finding throwing breaking making cleaning  
B. pressure cleaning attention light heat

13. It is economically sound to control water. Too much water means the destruction of life and property by flood. Too little water often brings the same results by drought. When water is controlled, it is available for \_\_\_\_\_ A \_\_\_\_\_ and for \_\_\_\_\_ B \_\_\_\_\_.

A. irrigation waste destruction music problems  
B. drowning floods scenery housing power

14. Ceremony plays its part in every society. It provides the greeting, "Good Morning," with which we acknowledge an event as minor as the \_\_\_\_\_ A \_\_\_\_\_ of a new day. It establishes the form in which we observe major events such as \_\_\_\_\_ B \_\_\_\_\_ or death.

A. passing end memory decline coming  
B. head colds quarrels marriage picnics parties

TURN THE PAGE AND GO RIGHT ON



15. Of the several kinds of birds that once were common in the United States but are now \_\_\_\_\_A\_\_\_\_\_, the Passenger Pigeon is perhaps the most famous. There were once so many that their millions \_\_\_\_\_B\_\_\_\_\_the sky.

- A. extinct prevalent numerous unpopular huge  
B. replaced swallowed conquered darkened refused

16. The regulation double-hung window in which each sash slides past the other, the outer one on top, was invented by, or at the time of, Thomas Jefferson. It is said he was annoyed at the way casement windows tangled with the draperies. Since then, \_\_\_\_\_A\_\_\_\_\_windows have become \_\_\_\_\_B\_\_\_\_\_in many parts of the country.

- A. bay casement picture double-hung screen  
B. doors standard blinds bigger weaker

17. With great reluctance man surrendered his belief in the earth as the center of the universe. To accept the idea that the earth is merely one of nine planets \_\_\_\_\_A\_\_\_\_\_a dying star seemed to \_\_\_\_\_B\_\_\_\_\_man's importance.

- A. fighting cheating lighting escaping circling  
B. distill prove diminish choose increase

18. A space station would be the earth's second satellite, but its first of the man-made variety. The moon is our first satellite, and a space station would behave according to the same \_\_\_\_\_A\_\_\_\_\_laws that \_\_\_\_\_B\_\_\_\_\_the moon.

- A. natural tyrant's man-made legislated popular  
B. trouble persuade created nourish govern

19. Since any object consumes its own mass as it gives off energy, the sun will eventually become an \_\_\_\_\_A\_\_\_\_\_cinder at the center of our \_\_\_\_\_B\_\_\_\_\_solar system.

- A. altruistic elated effervescent exhausted ebullient  
B. mundane livid frigid ergot frenetic

20. "No matter if the facts be physical or moral, they all have their causes . . . Vice and virtue are products, like vitriol and sugar; and every \_\_\_\_\_A\_\_\_\_\_phenomenon arises from other more simple \_\_\_\_\_B\_\_\_\_\_on which it hangs."

- A. ghastly eccentric raucous complex imaginary  
B. trivia phenomena counsels prodigality annulments

21. A part of a man can govern and otherwise \_\_\_\_\_A\_\_\_\_\_other parts of him. Supernatural and abstract \_\_\_\_\_B\_\_\_\_\_operate on man by habits and ideals instilled in him, especially in early life. It is only as notions of God, duty, etc., take up their abode in men that they become political \_\_\_\_\_C\_\_\_\_\_.

- A. stop injure influence abhor tolerate  
B. animals men money lights entities  
C. traders forces devils seances vapors

STOP HERE

Number correct (possible 43)..... Number wrong..... Raw score (number correct minus ¼ number wrong).....









**B29835**